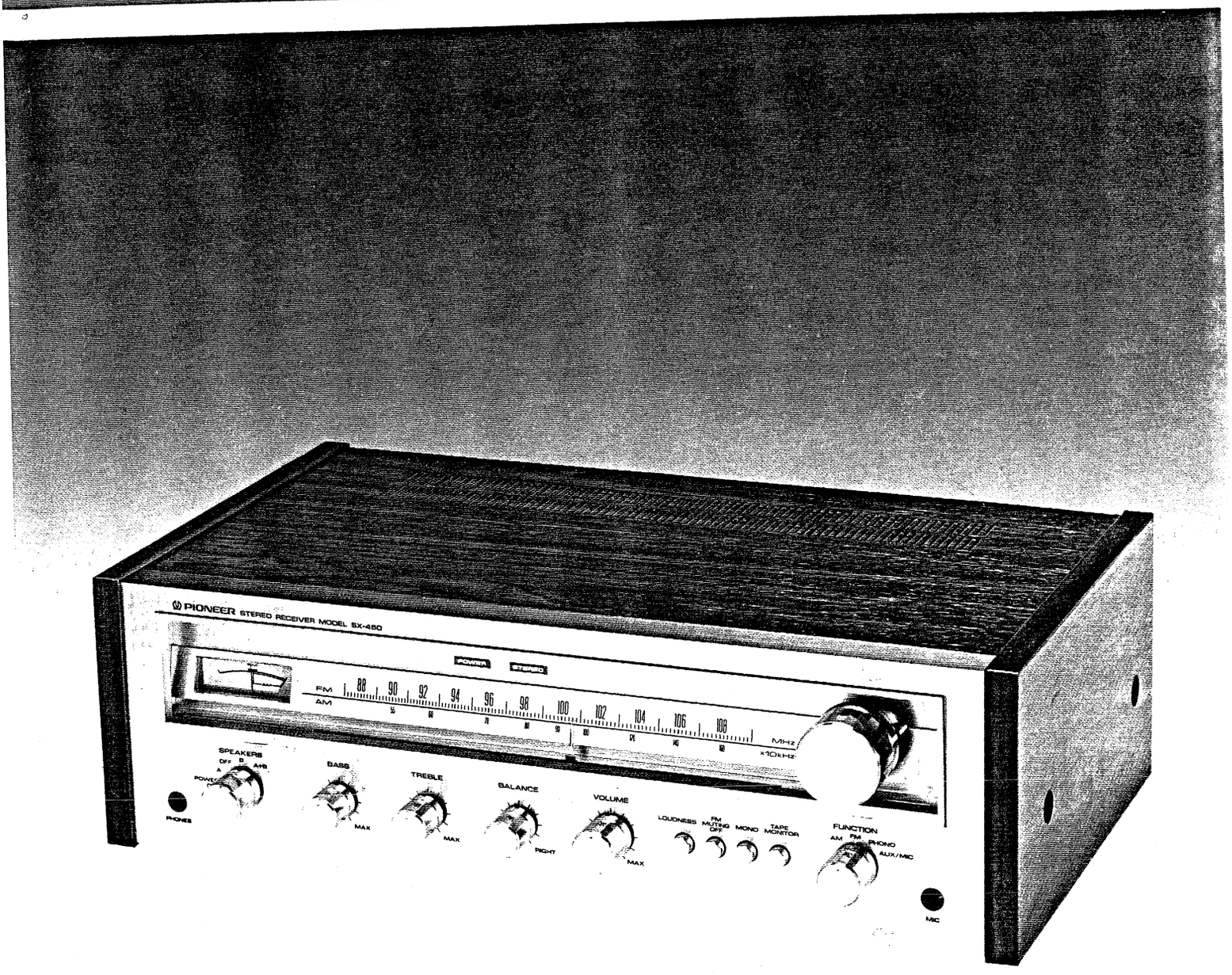
AM/FM STEREO RECEIVER

# SX-450

# SERVICE MANUAL




PIONEER®

*This Service Manual is applicable to the KU, KC types.*

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# 1. SPECIFICATIONS

### Semiconductors

FET ..... 1
ICs ..... 3
Transistors ..... 28
Diodes ..... 15

### Power Amplifier Section

Continuous Power Output from 20 Hertz to 20,000 Hertz (Both channels driven) ..... 15 watts per channel (8 ohms).

Total Harmonic Distortion (20 Hertz to 20,000 Hertz, from AUX)
  Continuous Rated Power Output ..... No more than 0.5%
  1 watt per channel power output,
    8 ohms. ..... No more than 0.1%
Intermodulation Distortion (50 Hertz : 7,000 Hertz = 4 : 1, from AUX)
  Continuous Rated Power Output ..... No more than 0.5%
  1 watt per channel power output,
    8 ohms ..... No more than 0.1%
Damping Factor
  (20Hz to 20,000Hz, 8 ohms) ..... 25
Input Sensitivity/Impedance
  PHONO ..... 2.5mV/50k ohms
  MIC ..... 7.5mV/50k ohms
  AUX ..... 150mV/50k ohms
  TAPE PLAY ..... 150mV/50k ohms
  TAPE PLAY (DIN connector) ..... 150mV/50k ohms
PHONO Overload Level—T.H.D. 0.1%)
  PHONO ..... 150mV (1kHz)
Output Level/Impedance
  TAPE REC ..... 150mV
  TAPE REC (DIN connector) ..... 30mV/80k ohms
  SPEAKER ..... A, B, A+B
  HEADPHONE ..... Low Impedance
Frequency Response
  PHONO (RIAA equalization) ..... 30Hz to 15,000Hz $^{+0.5}_{-1}$dB
  AUX, TAPE PLAY ..... 20Hz to 60,000Hz ±1dB
Tone Control
  BASS ..... +10dB, −9dB (100Hz)
  TREBLE ..... +9dB, −10dB (10kHz)
Loudness Contour (Volume control set at −40dB position) ..... +6dB (100Hz), +3dB (10kHz)
Hum and Noise (IHF, short-circuited, A Network, rated power)
  PHONO ..... 70dB
  AUX, TAPE PLAY ..... 90dB

### FM Section

Usable Sensitivity ..... MONO ..... 11.2dBf (2.0μV)
  STEREO ..... 20.0dBf (5.5μV)
50dB Quieting Sensitivity ..... MONO ..... 18.3dBf (4.5μV)
  STEREO ..... 39.2dBf (50μV)
Signal to Noise Ratio at 65dBf ..... MONO ..... 70dB
  STEREO ..... 65dB
Distortion at 65dBf 100Hz ..... MONO ..... 0.15%
  STEREO ..... 0.3%
  1kHz ..... MONO ..... 0.15%
  STEREO ..... 0.3%
  6kHz ..... MONO ..... 0.4%
  STEREO ..... 0.4%
Frequency Response ..... 30Hz to 15,000Hz $^{+0.3}_{-3}$dB
Capture Ratio ..... 1.0dB
Alternate Channel Selectivity ..... 60dB
Spurious Response Ratio ..... 75dB
Image Response Ratio ..... 65dB
IF Response Ratio ..... 85dB
AM Suppression Ratio ..... 50dB
Muting Threshold ..... 14dBf (2.8μV)
Stereo Separation ..... 40dB (1kHz), 30dB (30Hz ~ 15kHz)
Subcarrier Product Ratio ..... 40dB
SCA Rejection Ratio ..... 40dB
Antenna Input ..... 300 ohms balanced
  75 ohms unbalanced

### AM Section

Sensitivity (IHF, Ferrite antenna) . . . . . 300μV/m
(IHF, Ext. antenna) . . . . . 15μV
Selectivity . . . . . 35dB
Signal-to-Noise Ratio . . . . . 50dB
Image Rejection . . . . . 40dB
IF Rejection . . . . . 65dB
Antenna . . . . . Built-in Ferrite Loopstick Antenna

### Miscellaneous

Power Requirements . . . . . 120V 60Hz
Power Consumption . . . . . UL; 70W, 130W (max.)
CSA; 120VA
Dimensions . . . . . 448(W)x141(H)x307(D) mm
17-4/8(W)x5-9/16(H)x12-1/16(D) in
Weight . . . . . Without package . . . . . 8.6kg (19 lb)
With package . . . . . 9.7kg (21 lb 6 oz)

### Furnished Parts

FM T-type Antenna . . . . . 1
Operating Instructions . . . . . 1

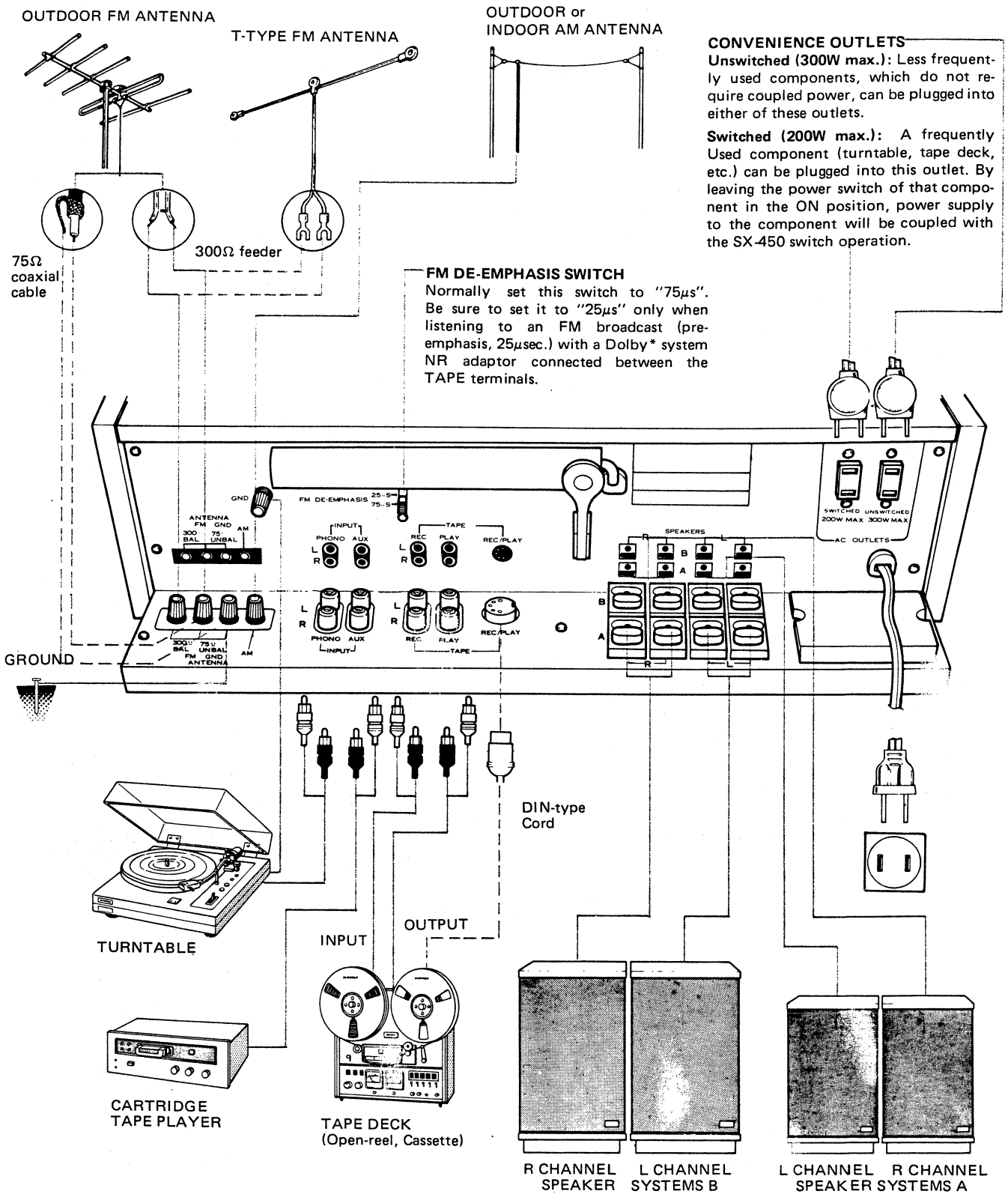
*NOTE:*
*Specifications and the design subject to possible modification without notice due to improvements.*

## MODEL SX-450 COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

| Type | Voltage | Remarks |
|---|---|---|
| KU<br>KC | 120V only | CSA (Canada) and UL (U.S.A.) approved with de-emphasis selector switch (25μs/75μs). |
| HG | 220V and 240V (Switchable) | SEMKO (Sweden), NEMKO (Norway), DEMKO (Denmark) and EI (Finland) approved. |
| S | 110V, 120V, 220V and 240V (Switchable) | General expoet model with de-emphasis selector switch (25μs/50μs/75μs). |

**When repairing S or HG type, please see the manual on page 57.**

# 2. CONNECTING DIAGRAM


OUTDOOR FM ANTENNA
T-TYPE FM ANTENNA
OUTDOOR or
INDOOR AM ANTENNA
75Ω
coaxial
cable
300Ω feeder
CONVENIENCE OUTLETS
Unswitched (300W max.): Less frequently used components, which do not require coupled power, can be plugged into either of these outlets.
Switched (200W max.): A frequently Used component (turntable, tape deck, etc.) can be plugged into this outlet. By leaving the power switch of that component in the ON position, power supply to the component will be coupled with the SX-450 switch operation.
FM DE-EMPHASIS SWITCH
Normally set this switch to "75μs". Be sure to set it to "25μs" only when listening to an FM broadcast (pre-emphasis, 25μsec.) with a Dolby* system NR adaptor connected between the TAPE terminals.
GROUND
DIN-type
Cord
TURNTABLE
INPUT
OUTPUT
CARTRIDGE
TAPE PLAYER
TAPE DECK
(Open-reel, Cassette)
R CHANNEL
SPEAKER
L CHANNEL
SYSTEMS B
L CHANNEL
SPEAKER
R CHANNEL
SYSTEMS A

# 3. FRONT PANEL FACILITIES

## SPEAKERS SWITCH (POWER)

A combined power ON/OFF switch and speaker system selector switch.

| | |
|---|---|
| POWER OFF: | Receiver off. |
| A: | To select speakers connected to the A speaker terminals. |
| OFF: | Speakers cut off (headphones can be used). |
| B: | Operates speakers connected to the B speaker terminals. |
| A+B: | To listen simultaneously to speaker systems connected to A and B speaker terminals. |

*NOTE:*
***For easier operation, plug power cord for turntable, etc. into the switched convenience outlet.***

## PHONES JACK

To listen through stereo headphones, plug them firmly into this jack.

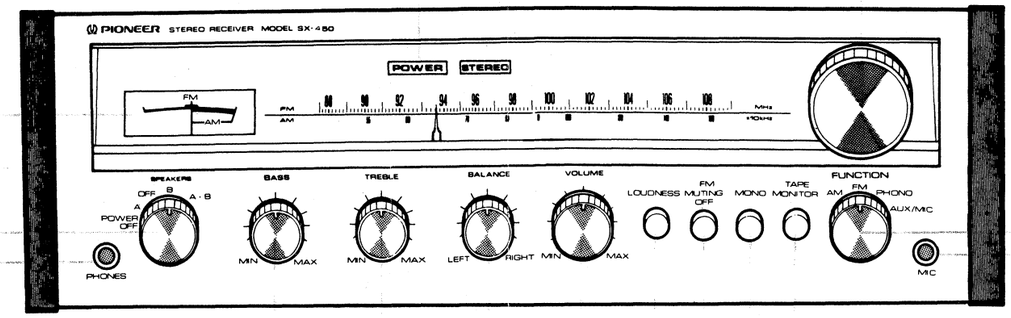
*WARNING:*
***Do not plug a microphone into the PHONES jack as you may damage the microphone.***

## AM/FM TUNING METER

When tuning in FM stations, position the needle in the center FM area for optimum reception. In the case of AM stations, tune for maximum meter deflection toward the right of the scale.

## PILOT LAMP

Lights to indicate AC power ON.




## BASS & TREBLE CONTROLS

Controls for adjusting the tone. Adjust low frequencies with the BASS control and high frequencies with the TREBLE control.
Turn controls toward the right (MAX) to enhance, and toward the left (MIN) to reduce, their respective frequency ranges.

## BALANCE CONTROL

Control for adjusting volume balance between left and right speakers or headphones. Clockwise rotation from center increases right channel volume, while counter-clockwise rotation increases left channel volume.

## FM STEREO INDICATOR

With the FUNCTION switch set to FM, the STEREO indicator lights while an FM stereo broadcast is being received.

## TUNING KNOB

Select the desired station while observing the AM/FM meter for optimum tuning.

## FM MUTING OFF BUTTON

Leave this button undepressed (in the ON position) to suppress unpleasant interstation noise while tuning between FM stations. Low-strength signals may also be suppressed by this function, so to pick up a weak station depress this button to the OFF position.

## LOUDNESS BUTTON

Depress this switch when listening at low volume. The frequency response of the human ear varies according to the listening level, and the depressed position compensates for hearing characteristics by emphasizing the bass and treble.

## VOLUME CONTROL

Clockwise rotation increases volume from speakers or headphones.

## FUNCTION SWITCH

Switch for selecting desired program source.

| | |
|---|---|
| AM: | For AM broadcast reception. |
| FM: | For FM stereo reception. Automatically receives monophonically during FM monophonic broadcasts. The STEREO indicator lights up when the broadcast is in stereo. |
| PHONO: | To operate a turntable connected to PHONO jacks. |
| AUX/MIC: | For listening to an audio component (cartridge tape player, TV sound tuner, etc.) connected to the AUX jacks. Also set to this position when using the microphone. Note, when the microphone is plugged in, the component connected to the AUX jacks cannot be used. |

## MIC JACK

A high impedance (approx. 50k-ohms) dynamic type microphone with a standard plug can be connected to this jack.

## TAPE MONITOR BUTTON

Depress this switch when using a tape deck for tape playback, or when monitoring a tape during recording.

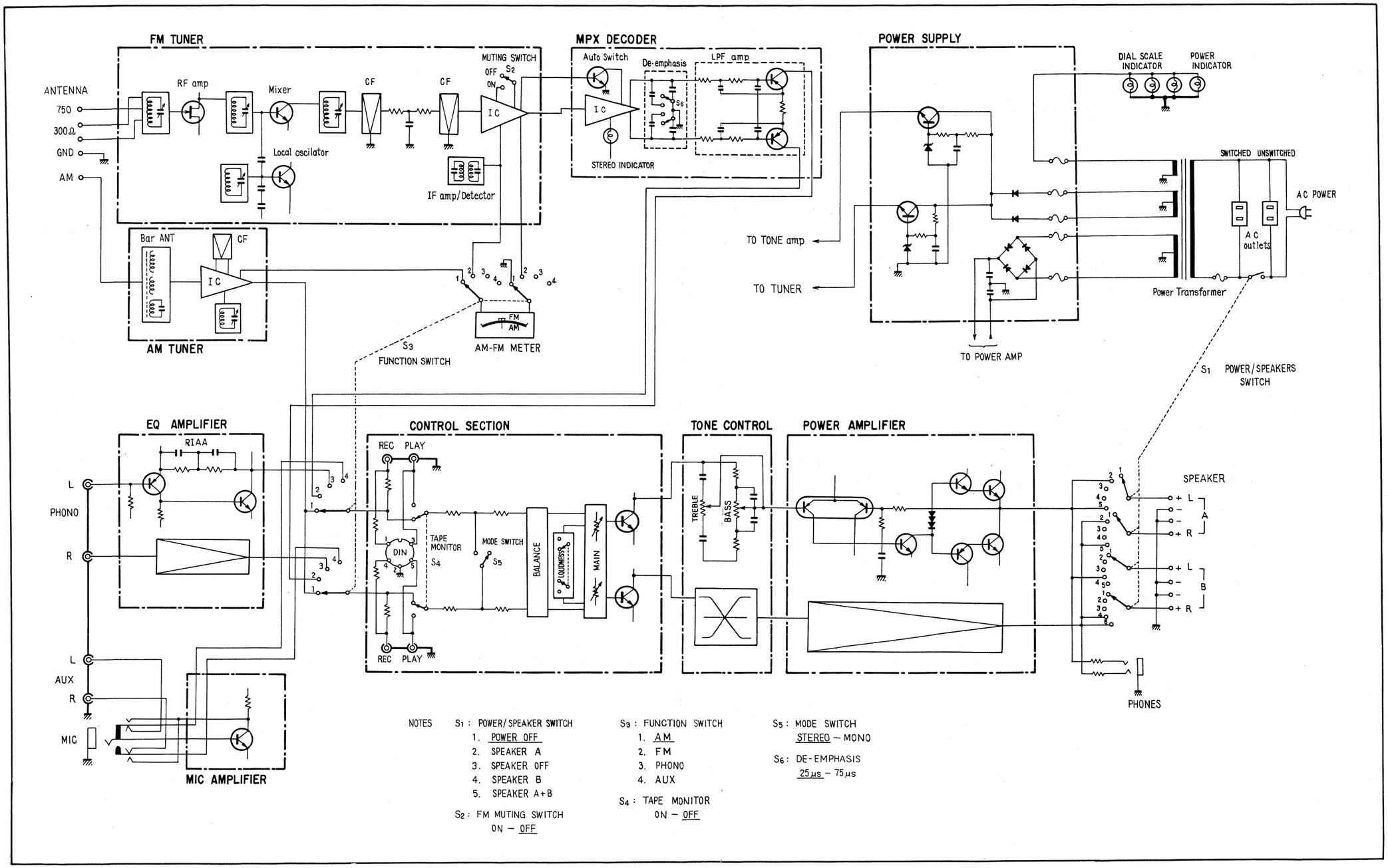
*NOTE:*
***Except for tape playback, keep this switch in the underpressed position.***

## MODE SWITCH (MONO)

For stereo playback leave this switch undepressed. When depressed for MONO playback, left and right channel stereo signals will be mixed to produce monophonic sound from both speaker systems.

*NOTE:*
***Recording stereophonically with the MODE switch in the MONO position may cause channel separation to deteriorate.***

# 4. BLOCK DIAGRAM




NOTES

S1 : POWER/SPEAKER SWITCH
1. POWER OFF
2. SPEAKER A
3. SPEAKER OFF
4. SPEAKER B
5. SPEAKER A+B

S2 : FM MUTING SWITCH
ON — OFF

S3 : FUNCTION SWITCH
1. AM
2. FM
3. PHONO
4. AUX

S4 : TAPE MONITOR
ON — OFF

S5 : MODE SWITCH
STEREO — MONO

S6 : DE-EMPHASIS
25μs — 75μs

# 5. CIRCUIT DESCRIPTIONS

## AM TUNER

Composed of a single IC (HA 1138) and single element ceramic filter. A 2-gang variable capacitor is employed with one stage providing tuning between the antenna and RF amplifier and the other stage tuning the local oscillator (Fig. 1).

## FM FRONT END

A frequency linear 3-gang variable capacitor is used with a single stage FET RF amplifier.
The FET possesses high input impedance compared with a transistor, and allows simple coupling with the input tuning circuit, plus a significant advantage in terms of noise.
The local oscillator is a variation of a Clapp circuit and its excellent temperature compensation provides stable frequency even without AFC. Local oscillator voltage is passed through a low value capacitor to the mixer transistor base.

## IF AMPLIFIER AND DETECTOR

Composed of two dual element ceramic filters and one IC (HA1137). The HA1137 is a high density IC and contains a limiter amplifier, FM detector (quadrature detector), muting, and meter drive circuits (Fig. 2).

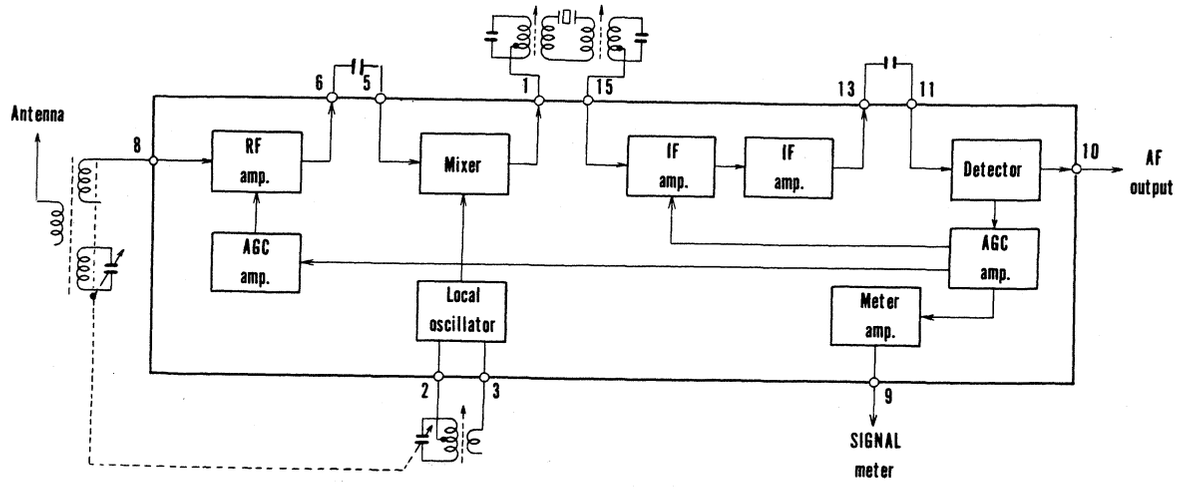



**Fig. 1** Block diagram for HA1138

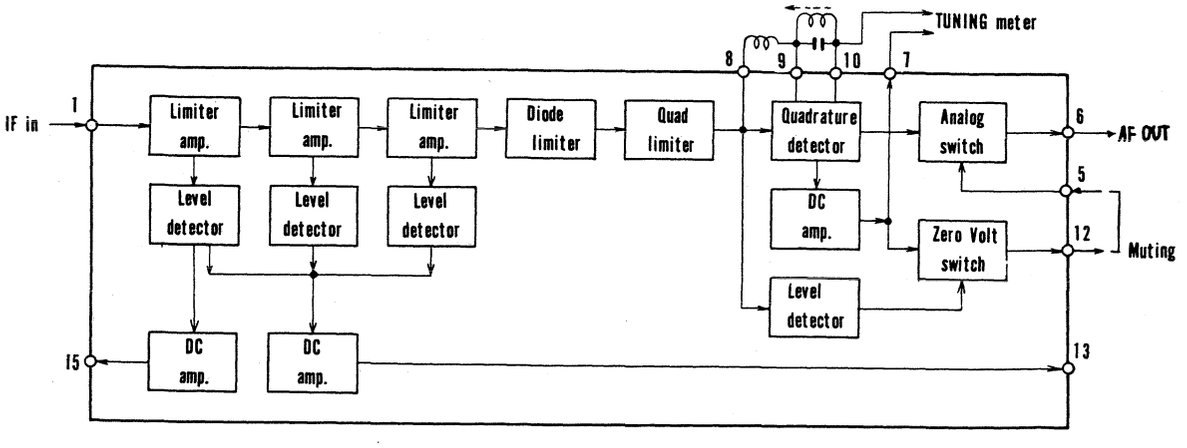



**Fig. 2** Block diagram for HA1137

## MULTIPLEX DECODER

Demodulation is performed by switching detection. A single IC (HA1156) composed the circuit, which is divided into 3 sections.
The block diagram is shown in Fig. 3.

### 1. Switching signal generator

A PLL (phase locked loop) system is employed. 76kHz is generated by a VCO (voltage controlled oscillator) and converted into 19kHz by a frequency divider.
This signal and the pilot (19kHz) of the received signal are applied to the phase comparator, which converts the phase differences of the two signals into a voltage. This voltage is then fed back to the VCO. The oscillator signal phase becomes locked to the pilot signal by this loop (PLL) and a 38kHz signal synchronized to the pilot signal is obtained and employed as the switching signal.

### 2. Automatic stereo detector

With the PLL locked to the pilot signal, the pilot signal and a 19kHz signal of the same phase are produced. A voltage is then obtained at the phase comparator that is proportional to the pilot signal amplitude. As it increases, the lamp lights and switch becomes on.
The switching signal is applied to the demodulator.

### 3. Demodulator

A differential amplifier is employed in a switching detection system. Fig. 4 shows the basic circuit. The composite signal is applied to Q3, while the switching signal (38kHz) goes to Q1 and Q2, causing the coposite signal to become alternately on and off. The 38kHz carrier is cancelled by C1, R1 and C2, R2.
Square wave of 180° angle of current flow is employed as the switching signal in order to increase demodulation efficiency. However, since only about 13dB separation can be obtained from this basic design, the actual circuit becomes as shown in Fig. 5. It combines two Fig. 4 circuits, with Q4 — Q6 cancelling crosstalk.
The composite signal appearing at Q3 emitter is applied to Q6 emitter and a low level signal is produced at Q6 collector in opposite phase to Q3. This signal is employed for composition at the collector, cancelling crosstalk. By adjusting $R_E$ in this circuit, separation can be improved to about 40dB.

## MICROPHONE CIRCUIT

A single transistor amplifier (monophonic) is provided in addition to the phono equalizer amplifier. A selector switch cuts the AUX jack input when a plug is inserted into the MIC jack. The

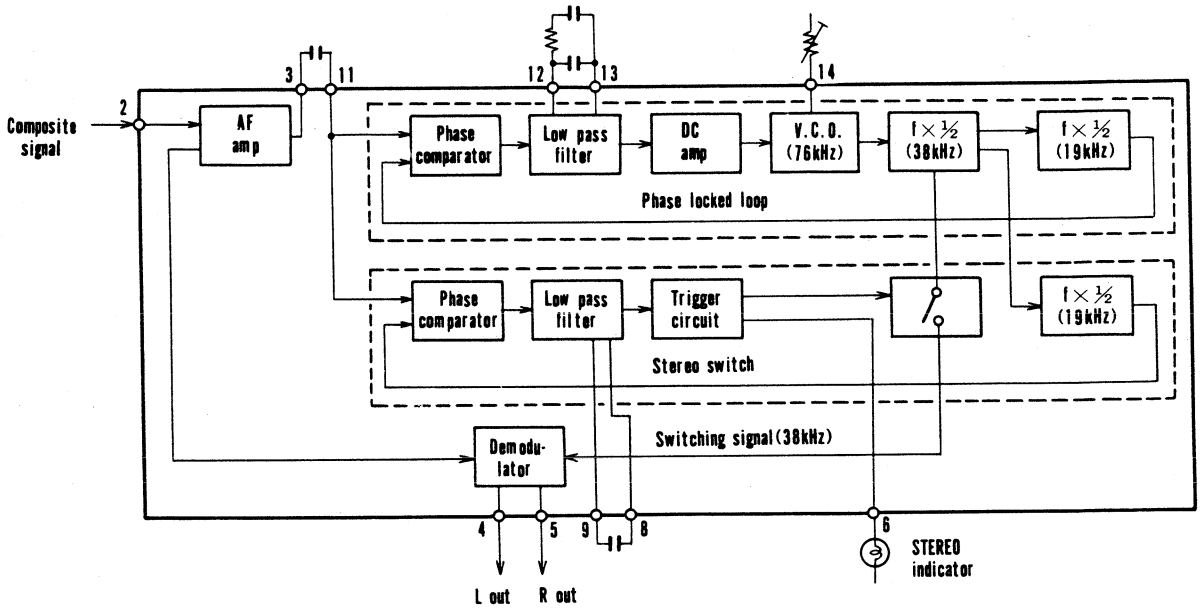



Fig. 3 Block diagram for HA1156

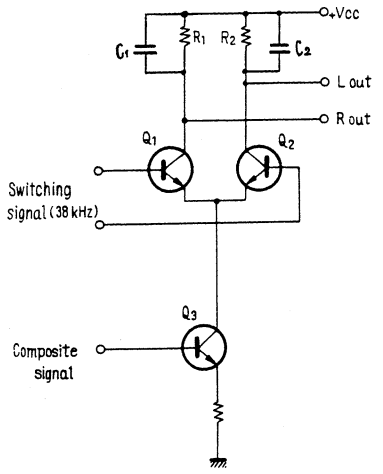



Fig. 4

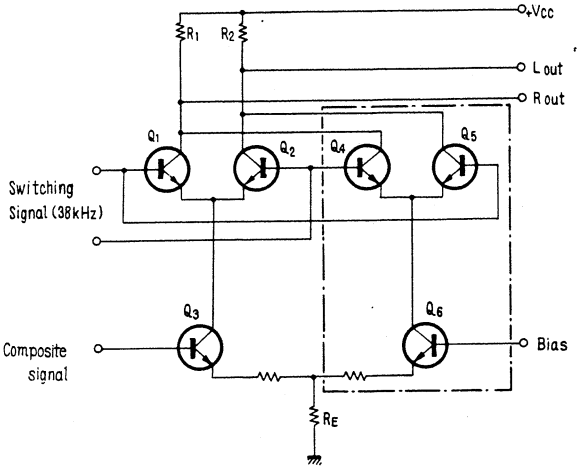



Fig. 5

amplified microphone signal is then supplied to both the left and right channels. The FUNCTION switch is set to the AUX position when using a microphone.

## TONE CONTROL

A CR network tone control system is used. The attenuator circuits used each consist of a capacitor and a resistor. They increase and decrease the relative levels of high and low frequency sound. Because the attenuator gives relative control over the frequency response, there is constant loss. The compensate for this, an amplifier is employed prior to this stage.

## EQUALIZER AMPLIFIER

This amplifier amplifies the low level signals from the cartridge inputs. Equalization is performed in accordance with the RIAA curve. This is a two-stage, direct-coupled, collector-to-emitter feedback type.

## POWER AMPLIFIER

Power amplifier employs all stage direct-coupled quasi complementary circuit (Fig. 6).

It is an OCL circuit with balanced positive and negative power supply and center output potential kept at 0V.

The first stage (Q201 and Q203) composes a diffential amplifier designed for both signal amplification and stabilization of the center point potential.

The predriver (Q205) is a class A amplifier. The next stage (Q207 and Q209) composes a complementary circuit and employs a Darlington connection Q207 — Q211 and inverted Darlington connection Q209 — Q213 with the final stage.

## POWER SUPPLY

Voltage of Q301 and Q302 bases are controled by zener diodes (D303, D304).

Tuner power is taken from Q302 emitter. Since this is at the power transformer secondary, AC line variation do not directry reach the tuner.

Also supplied balanced positive and negative power from bridge rectifier and two 4,700μF capacitors to the power stage (Fig. 7)

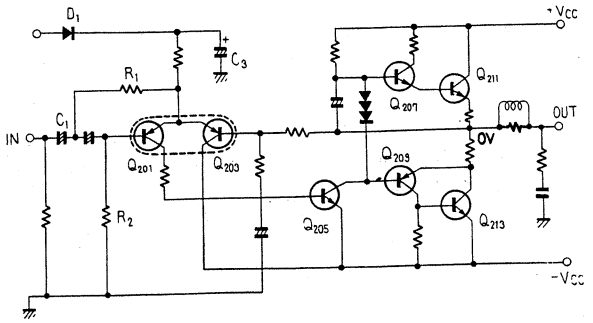



Fig. 6

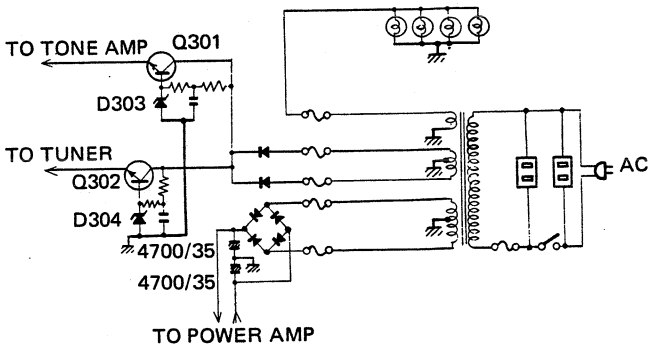



Fig. 7

# 6. DISASSEMBLY

## SIDE PANEL

Remove the 4 screws on the each side of the side panel as shown in Fig. 8.

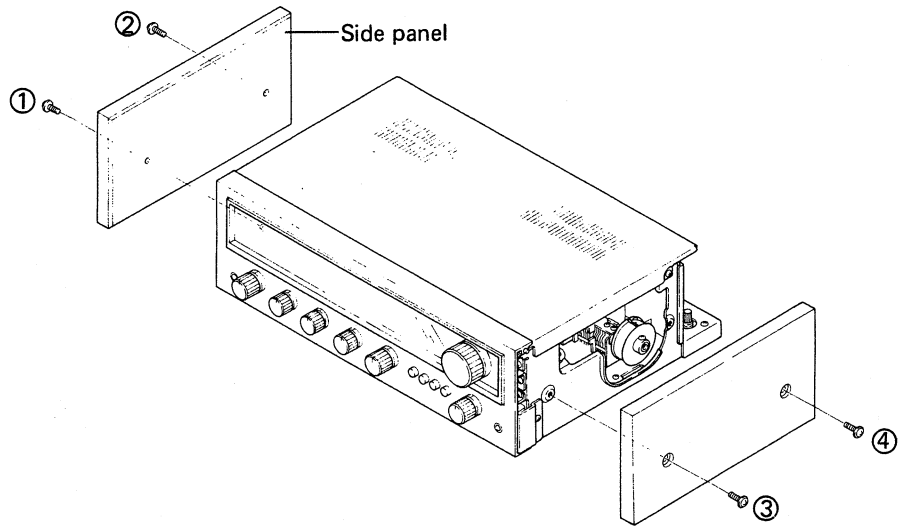



Fig. 8

## TOP PLATE

Remove the 2 screws to detach the top plate as shown in Fig. 9.

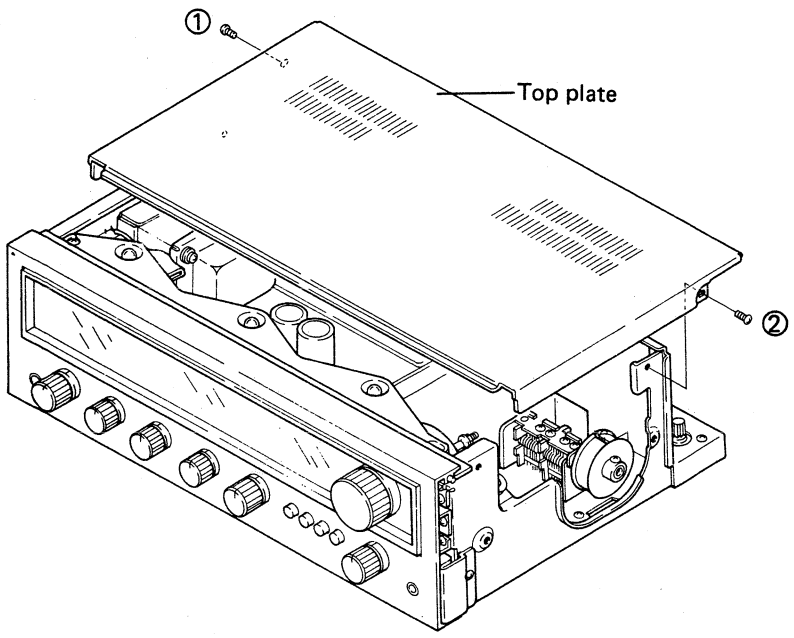



Fig. 9

## BOTTOM PLATE

Remove the 8 screws to detach the bottom plate as shown in Fig. 10.

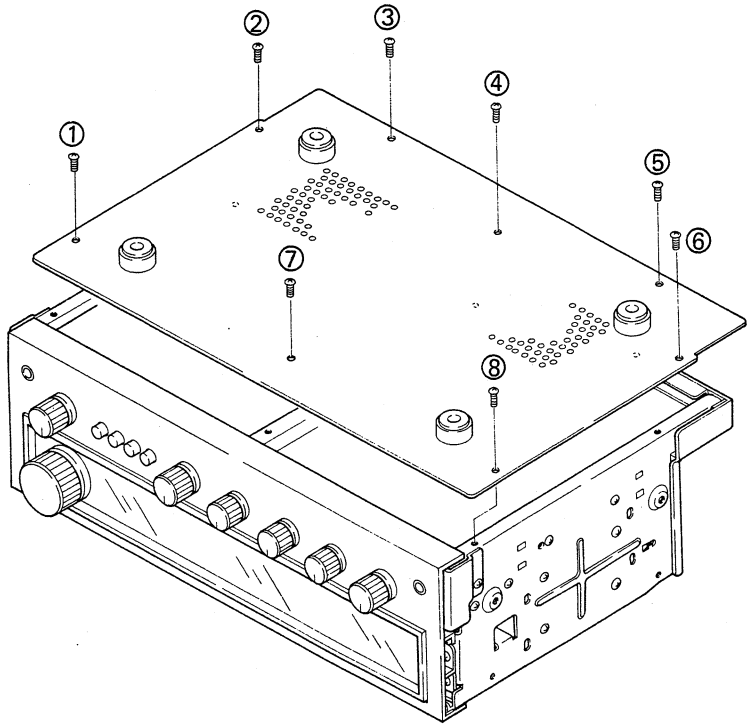



Fig. 10

## FRONT PANEL

1. Pull off all knobs (except push switch knob), then remove shaft nuts A, B of FUNCTION and SPEAKER switches.
2. Remove the 2 screws (Left and Right) from the edge of the front panel.
3. Remove the front panel as shown in Fig. 11.

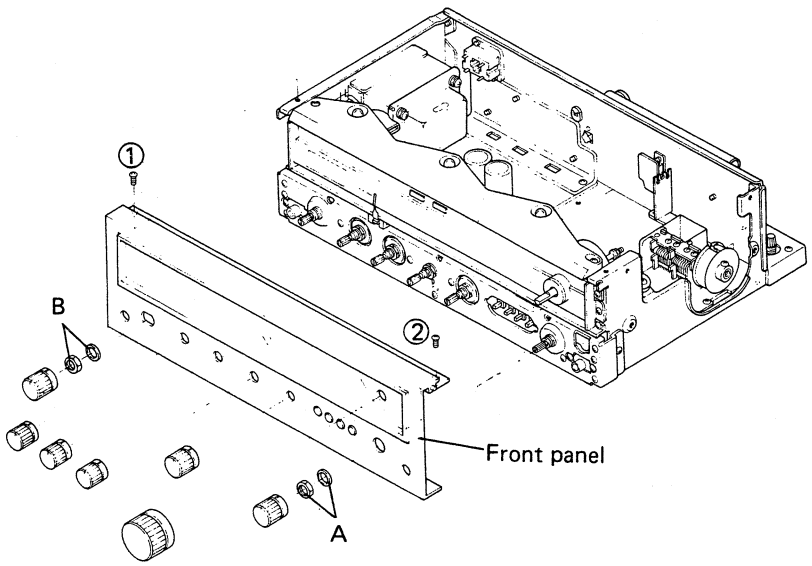
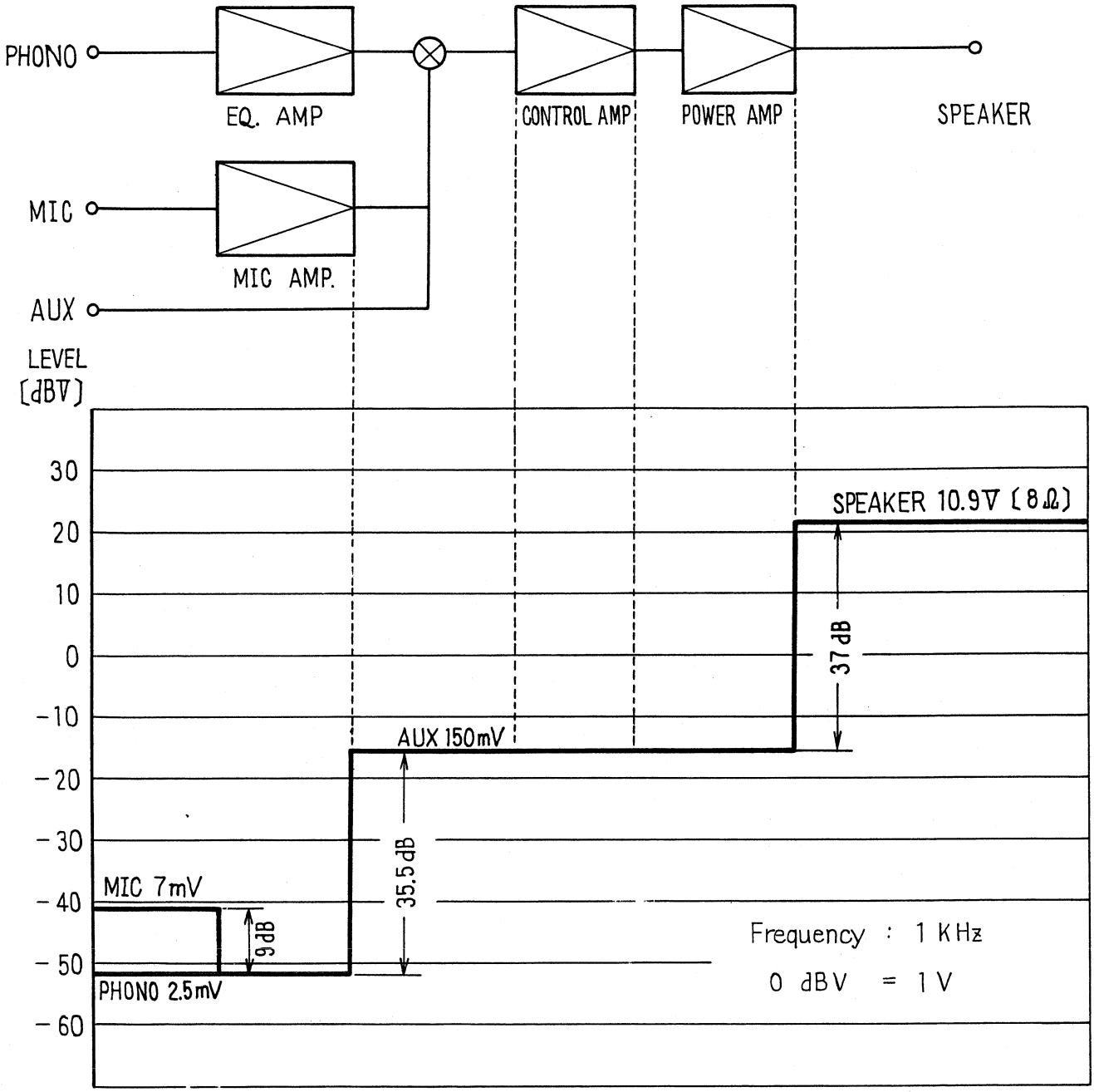


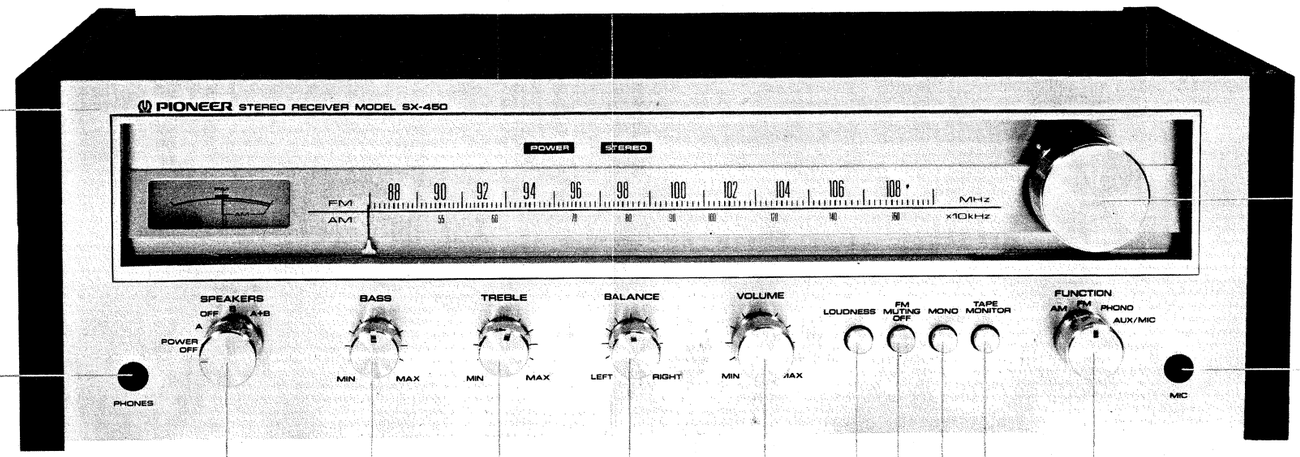

Fig. 11

# 7. LEVEL DIAGRAM



# 8. PARTS LOCATIONS

## 8.1 FRONT PANEL VIEW




Front panel assembly
ANB-443

Phone jack
AKN-009

Knob (SPEAKER)
AAB-100

Knob (BASS)
AAB-099

Knob (TREBLE)
AAB-099

Knob (BALANCE)
AAB-099

Knob (VOLUME)
AAB-100

Knob (TUNING)
AAA-036

Phone jack (MIC)
AKN-011

Knob (FUNCTION)
AAB-100

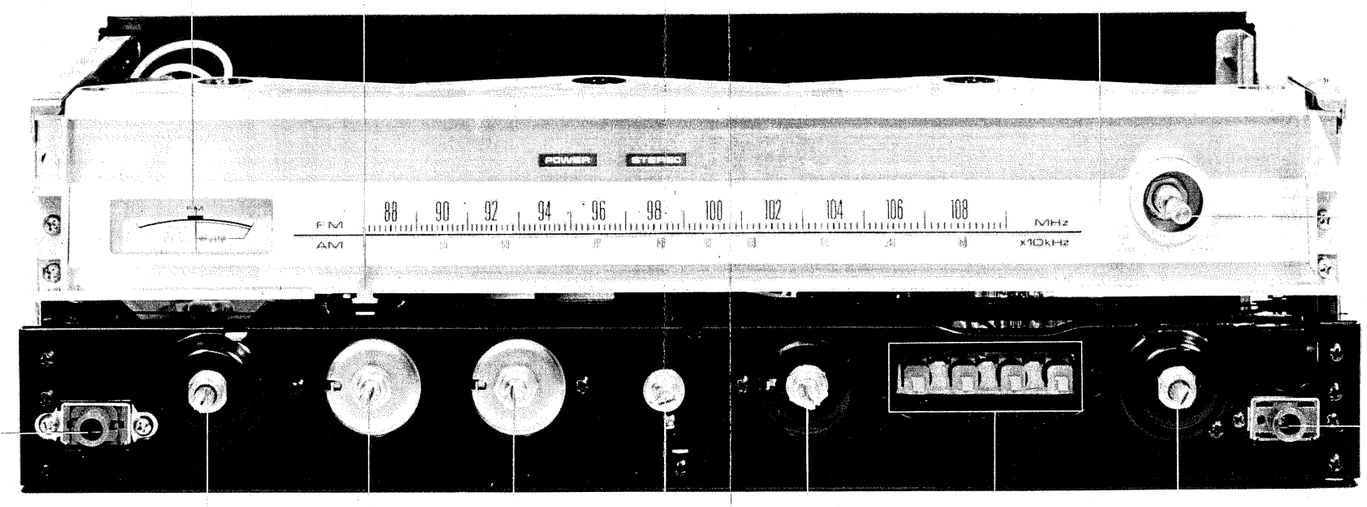
Knob (TAPE MONITOR)
AAD-110

Knob (MONO)
AAD-110

Knob (FM MUTING)
AAD-110

Knob (LOUDNESS)
AAD-110

## 8.2 FRONT VIEW WITH PANEL REMOVED




Dial pointer assembly
AAF-046

Meter (AM/FM)
AAW-053

Dial scale board
AAG-113

Tuning shaft assembly
AXA-117

Phone jack
AKN-009

Phone jack (MIC)
AKN-011

Rotary switch (FUNCTION)
ASD-048

Push switch assembly
ASG-115

Variable resistor (VOLUME)
ACV-161

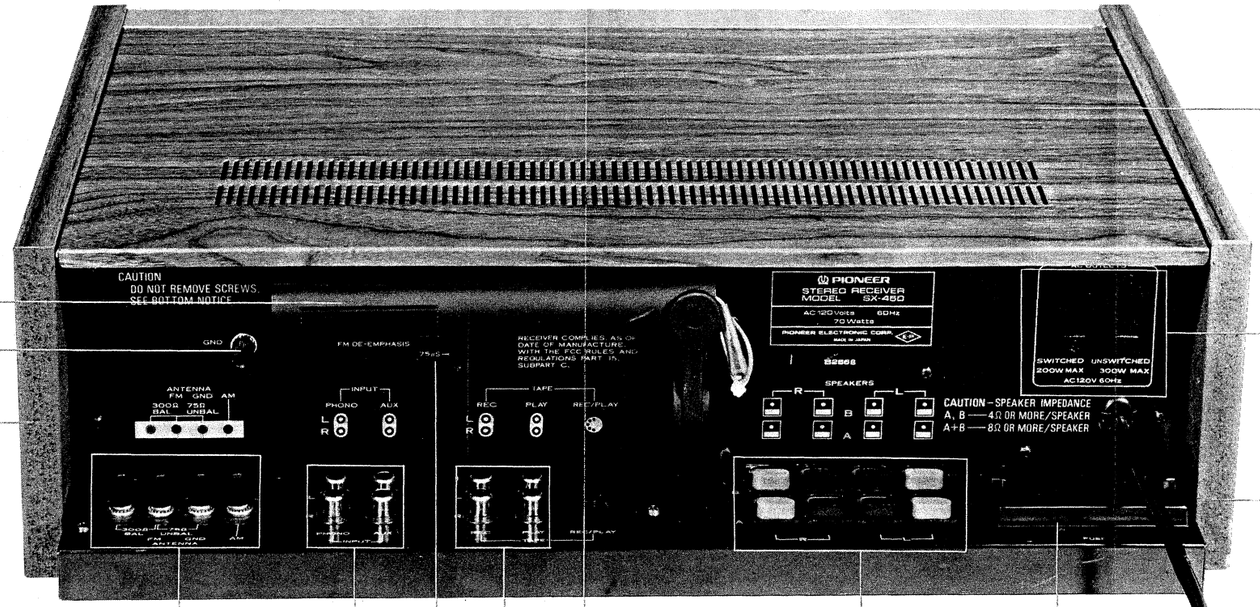
Rotary switch (SPEAKER)
ASA-042

Variable resistor (BASS)
ACV-180

Variable resistor (TREBLE)
ACV-180

Variable resistor (BALANCE)
ACV-020

## 8.3 REAR PANEL VIEW




Top plate
ANE-120

Ferrite Bar-antenna
AXB-006

Terminal (GROUND)
AKE-031

AC socket (AC OUTLETS)
AKP-004

Side panel (R)
AMS-013

Side panel (L)
AMS-012

Terminal (ANTENNA)
AKE-028

AC cord
ADG-005 (KU)
ADG-011 (KC)

Terminal (INPUT)
AKB-027

Slide switch (FM DE-EMPHASIS)
ASH-015

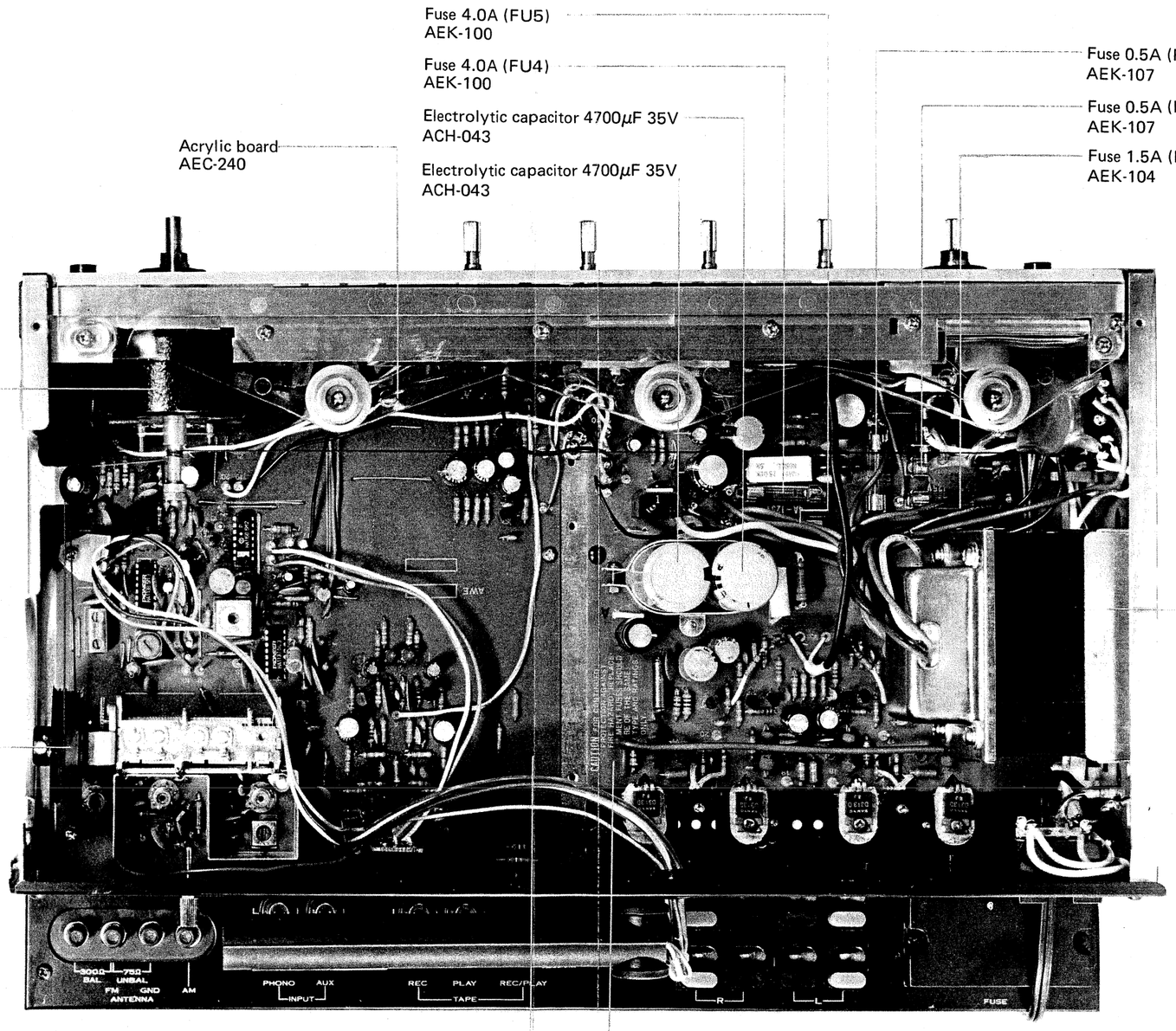
Terminal (TAPE)
AKB-027

Fuse cover
AEC-249

DIN socket
AKP-011

Terminal (SPEAKER)
AKE-029

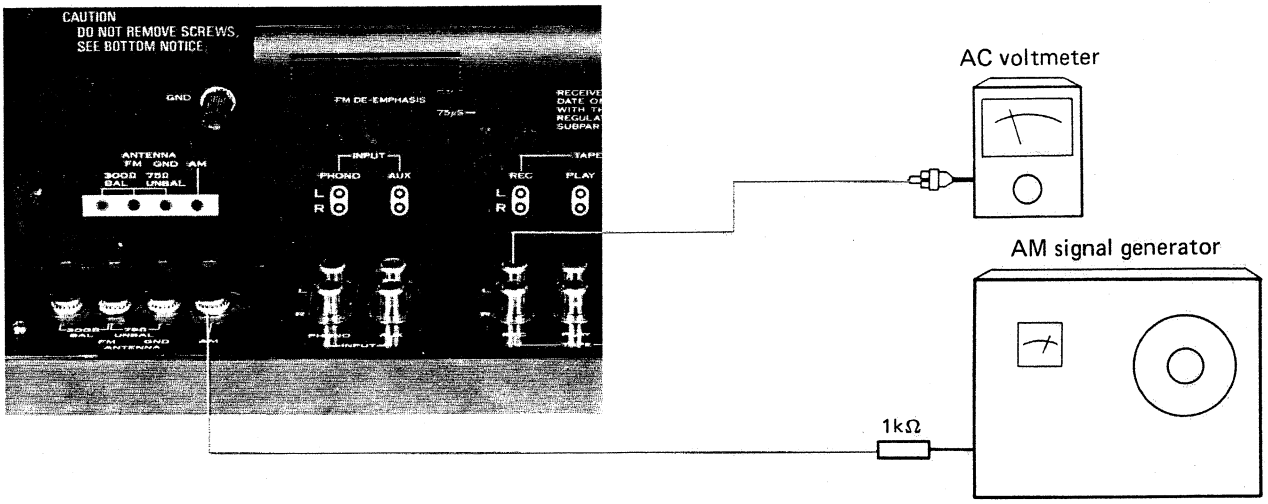
## 8.4 TOP VIEW WITH COVER REMOVED

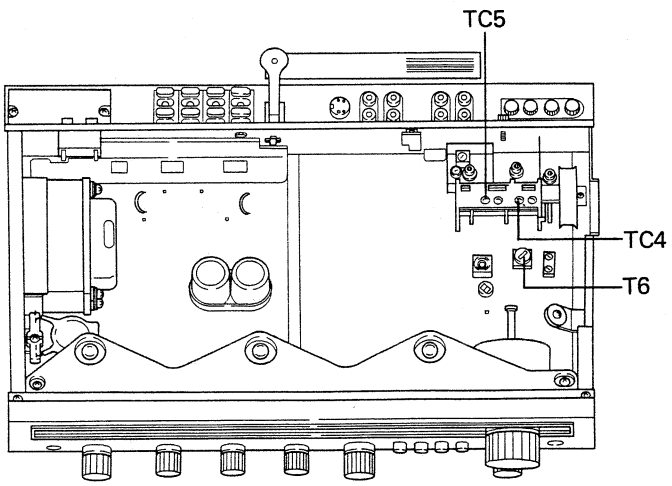


# 9. ADJUSTMENT

## 9.1 AM SECTION

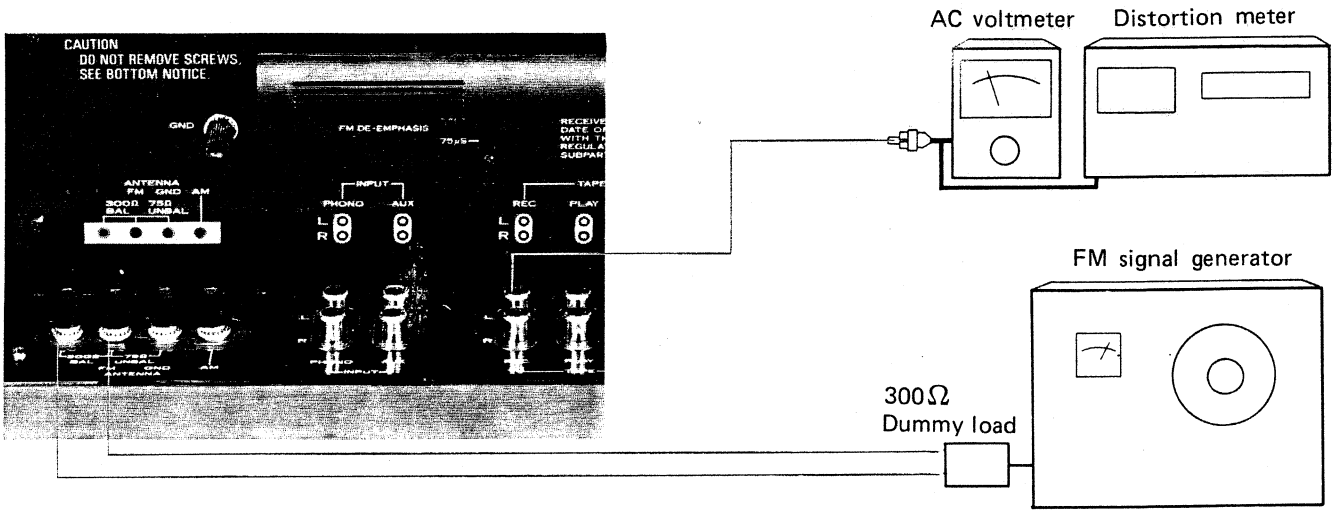
1. Through a 1k ohm resistor, connect an AM signal generator to the AM antenna terminal. Set for 400Hz at 100dB and 30% modulation.
2 Connect AC voltmeter to TAPE REC jack (L or R).
3. Set FUNCTION switch to AM position.
4. Set AM signal generator and SX-450 dial indication to point A (600kHz).
5. Adjust T6 for maximum indication on AC voltmeter.
6. Set AM signal generator and SX-450 dial indication to point C (1,400kHz).
7. Adjust TC4 for maximum indication on AC voltmeter.
8. Again set AM signal generator and SX-450 dial indication to point A.
9. Adjust bar antenna core for maximum indication on AC voltmeter.
10. Return AM signal generator and SX-450 dial indication to point C.
11. Adjust TC5 for maximum indication on AC voltmeter.
12. Repeat steps 4-11 to eliminate variations in AC voltmeter indications at point A and C.

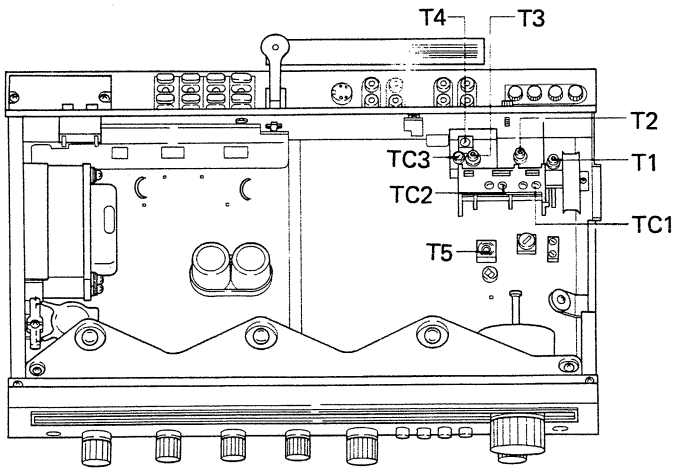


## 9.2 FM SECTION

1. Through 300 ohm dummy antenna, connect FM signal generator to the 300 ohm FM antenna terminals and set for 400Hz at 100dB and 100% modulation.
2. Connect AC voltmeter and distortion meter to TAPE REC jack (L or R).
3. Set FUNCTION switch to FM and MUTING switch to OFF.
4. Set FM signal generator and SX-450 dial indication to point A (90MHz).
5. Adjust T3 for maximum indication on AC voltmeter.
6. Adjust T5 lower core for center of scale indication on AM/FM meter.
7. Set FM signal generator for 9dB output and adjust T1 and T2 for maximum indication on AC voltmeter.
8. Set FM signal generator and SX-450 dial indication to point C (106MHz).
9. Adjust TC3, then TC1 and TC2 for maximum indication on AC voltmeter.
10. Again set FM signal generator and SX-450 dial indication to point A.
11. Adjust T3, then T1 and T2 for maximum indication on AC voltmeter.
12. Repeat steps 8-11 to eliminate variations in sensitivity at points A and C.
13. Adjust T4 for maximum sensitivity.
14. Detune to noise only and adjust T5 lower core for center of scale indication on FM meter.
15. Set SX-450 dial indication to point B (98MHz) and adjust FM signal generator for center of scale indication on AM/FM meter.
16. Set FM signal generator output to 60dB and adjust T5 upper core for minimum distortion.
17. Repeat steps 14-16 eliminate variation in minimum distortion position.



## 9.3 MPX SECTION

1. Through 300 ohm dummy antenna, connect FM signal generator to 300 ohm FM antenna terminals.
2. Connect multiplex signal generator to external modulation terminals of FM signal generator.
3. Connect oscilloscope horizontal input to MPX signal pilot output and vertical input via probe to TP (No. 13) of circuit board.
4. Set SX-450 dial indication to 98MHz and adjust FM signal generator for center of scale indication on AM/FM meter.
5. With FM signal generator unmodulated, adjust VR1 so that lissajous pattern on oscilloscope becomes stationary as shown in Fig. 12.
6. With MPX signal generator modulation 1kHz, L + R 67.5kHz deviation and pilot 7.5kHz deviation, adjust T4 for minimum distortion.

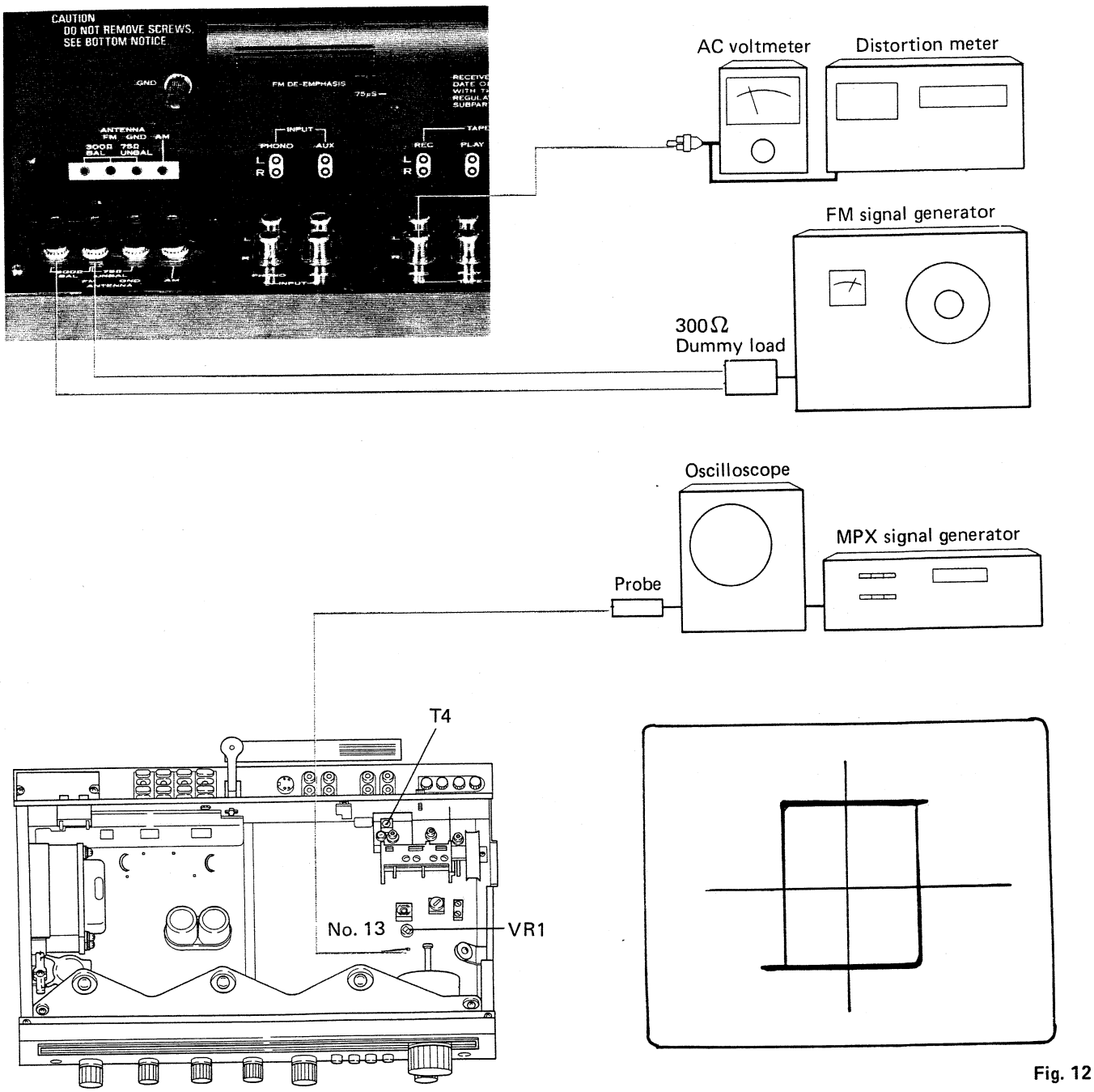
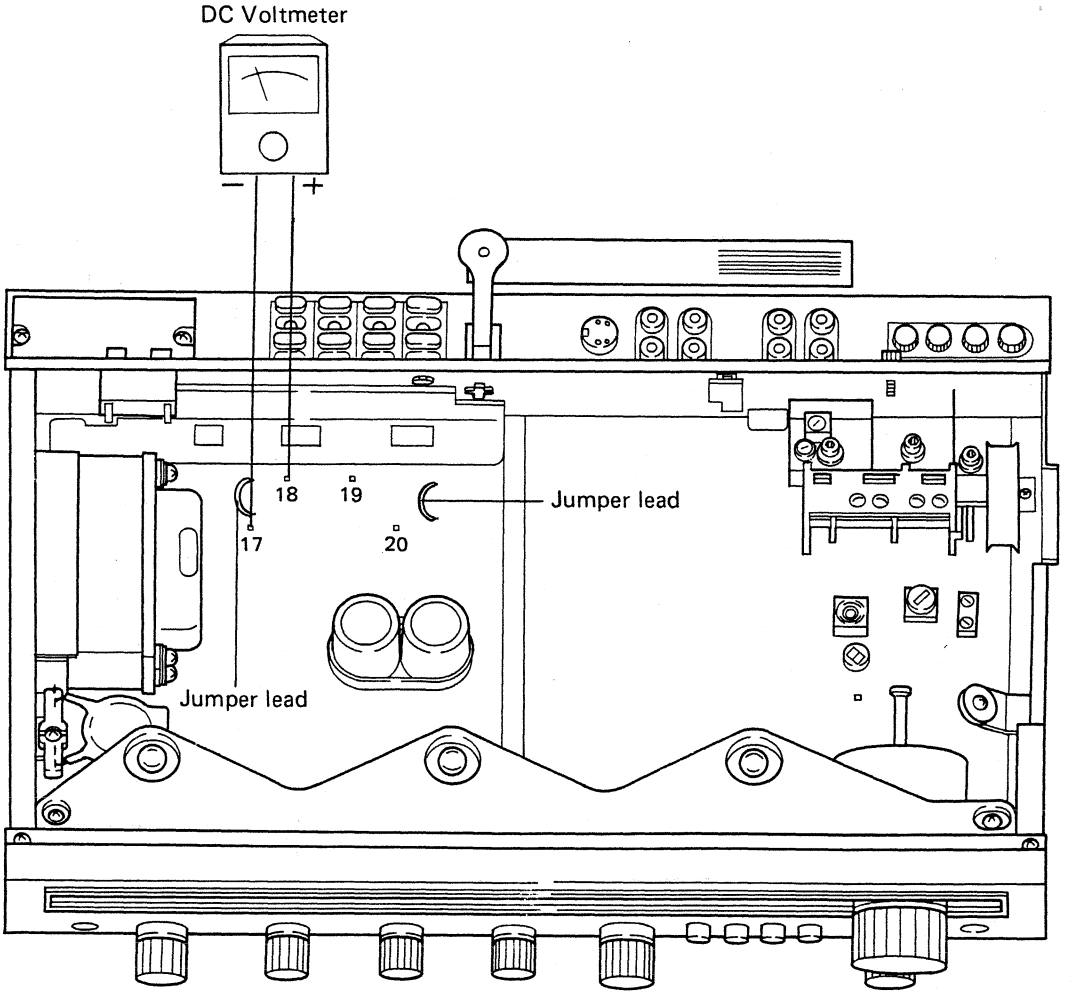



Fig. 12

## 9.4 POWER AMPLIFIER SECTION (IDLE CURRENT)

1. Set BASS and TREBLE controls to center position.
2. Nothing should be connected to the INPUT jacks of SX-450 and an 8 ohm dummy load should be connected across the SPEAKER terminal.
3. A DC voltmeter should be connect across between terminal number 19 (+), 20 (—) for Left channel and 18 (+), 17 (—) for Right channel.
4. Cut the jumper lead, if the voltage less than 15mV.



# 10. DIAL CORD STRINGING

Remove the Front panel (See page 14, 15).

1. Turn tuning drum fully clockwise (as viewed from X direction in Fig. 13).
2. Tie one end of cord to stud on inner section of tuning drum (more easily performed by loosening setscrew and temporarily removing tuning drum from shaft).
3. Pass cord through pulley opening, make a half turn around the pulley, then route in the sequence: pulley A-Dial needle-pulley B-C.
4. Wind cord clockwise (as viewed from rear panel) 3 turns around dial shaft, then route to pulley D.
5. Wind 3 turns around dial pulley and tie to spring so that the cord is under tention.
6. Turn TUNING knob and confirm normal cord-motion, then trim off excess cord.
7. With tuning capacitorblades fully closed, move dial needle to starting point (left edge of scale).
8. Apply laquor to tied ends of cord.

**DIAL NEEDLE INSTALLATION CAUTION**

Metal portion of dial pointer is plated.
If this section is touched directly by hand or fingerprints and other impurities, it is difficult to remove dirt from aventurine finish. As this is not desirable in terms of both appearance and anti-corrosion, take exteme care not to touch the metal section when handling the dial needle.

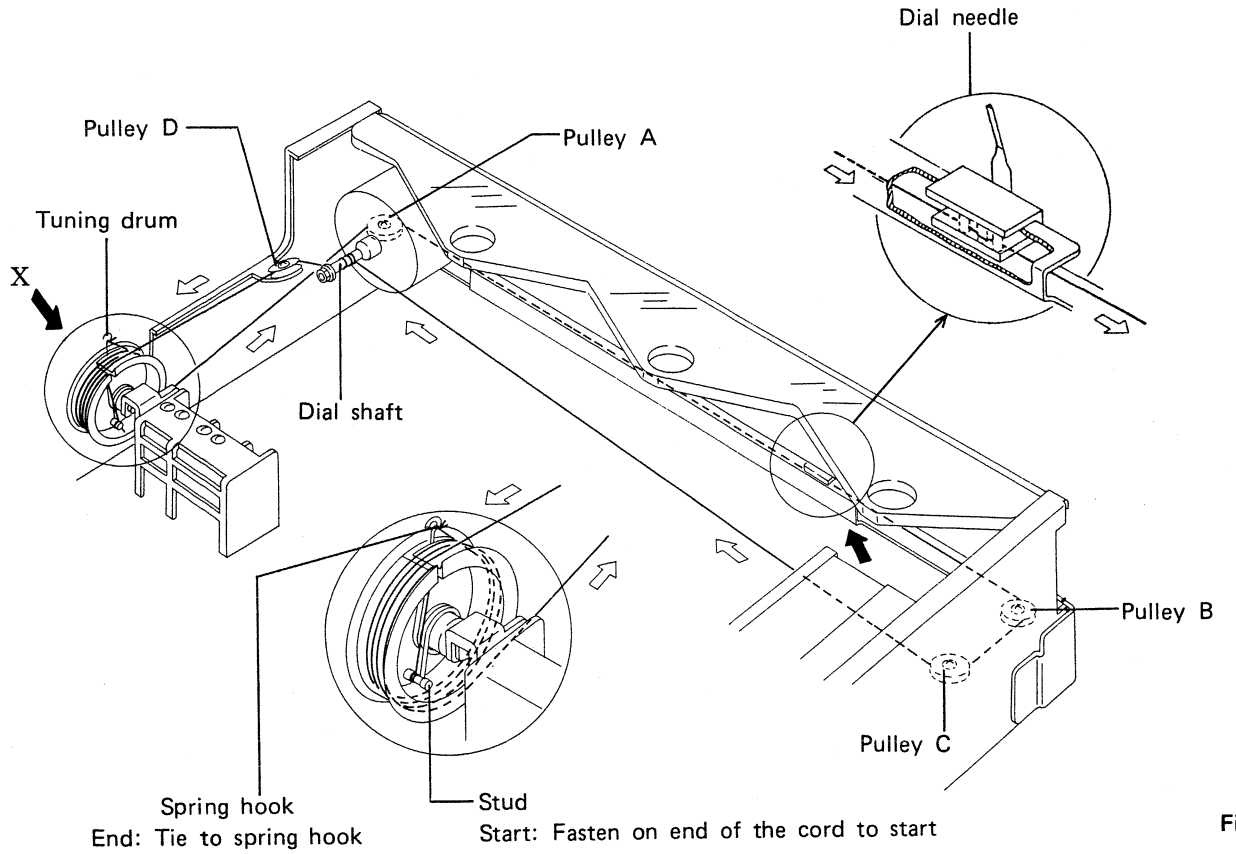
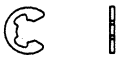
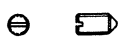
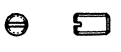



Fig. 13

# 11. NOMENCLATURE OF SCREWS, WASHERS AND NUTS

The following symbols stand for screws, washers and nuts as shown in exploded view.

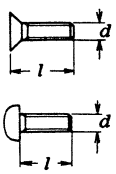
| Symbol | Description | Shape |
|---|---|---|
| RT | Brazier head tapping screw | |
| PT | Pan head tapping screw | |
| BT | Binding head tapping screw | |
| CT | Countersunk head tapping screw | |
| TT | Truss head tapping screw | |
| OCT | Oval countersunk head tapping screw | |
| PM | Pan head machine screw | |
| CM | Countersunk head machine screw | |
| OCM | Oval countersunk head machine screw | |
| TM | Truss head machine screw | |
| BM | Binding head machine screw | |
| PSA | Pan head screw with spring lock washer | |
| PSB | Pan head screw with spring lock washer and flat washer | |
| PSF | Pan head screw with flat washer | |

| Symbol | Description | Shape |
|---|---|---|
| EW | E type washer |  |
| FW | Flat washer | |
| SW | Spring lock washer | |
| N | Nut | |
| WN | Washer faced nut | |
| ITW | Internal toothed lock washer | |
| OTW | Outernal toothed lock washer | |
| SC | Slotted set screw (Cone point) |  |
| SF | Slotted set screw (Flat point) |  |
| HS | Hexagon socket headless set screw | |
| OCW | Oval countersunk head wood screw | |
| CW | Countersunk head wood screw | |
| RW | Round head wood screw | |
| | | |

EXAMPLE

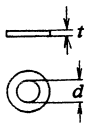
PM・3x8

- length in mm ( *l* )
- diameter in mm ( *d* )
- Symbol




FW・9φx1$^{t}$

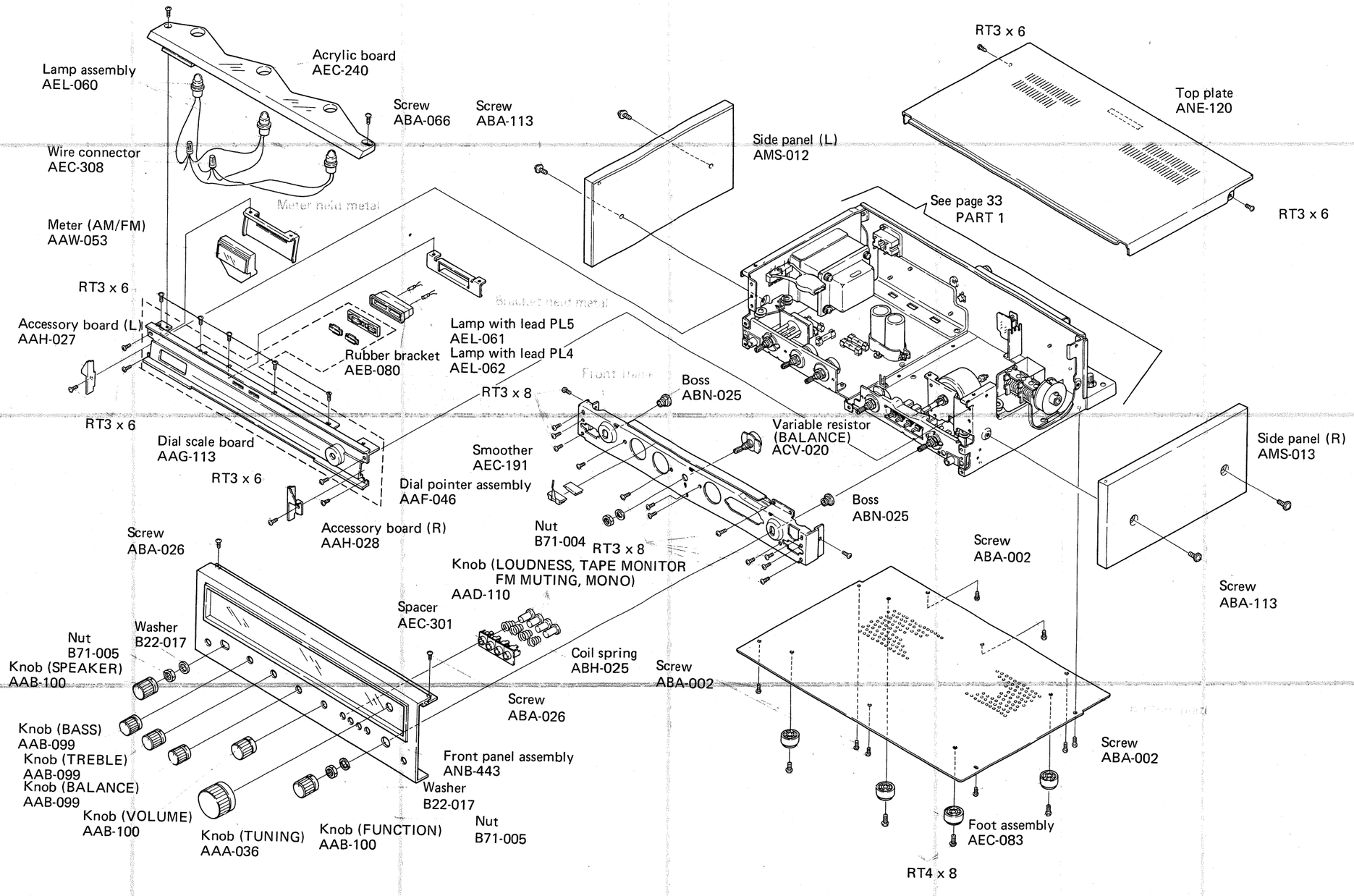
- thickness in mm ( *t* )
- diameter in mm ( *d* )
- Symbol



# 12. ASSEMBLY EXPLODED VIEW

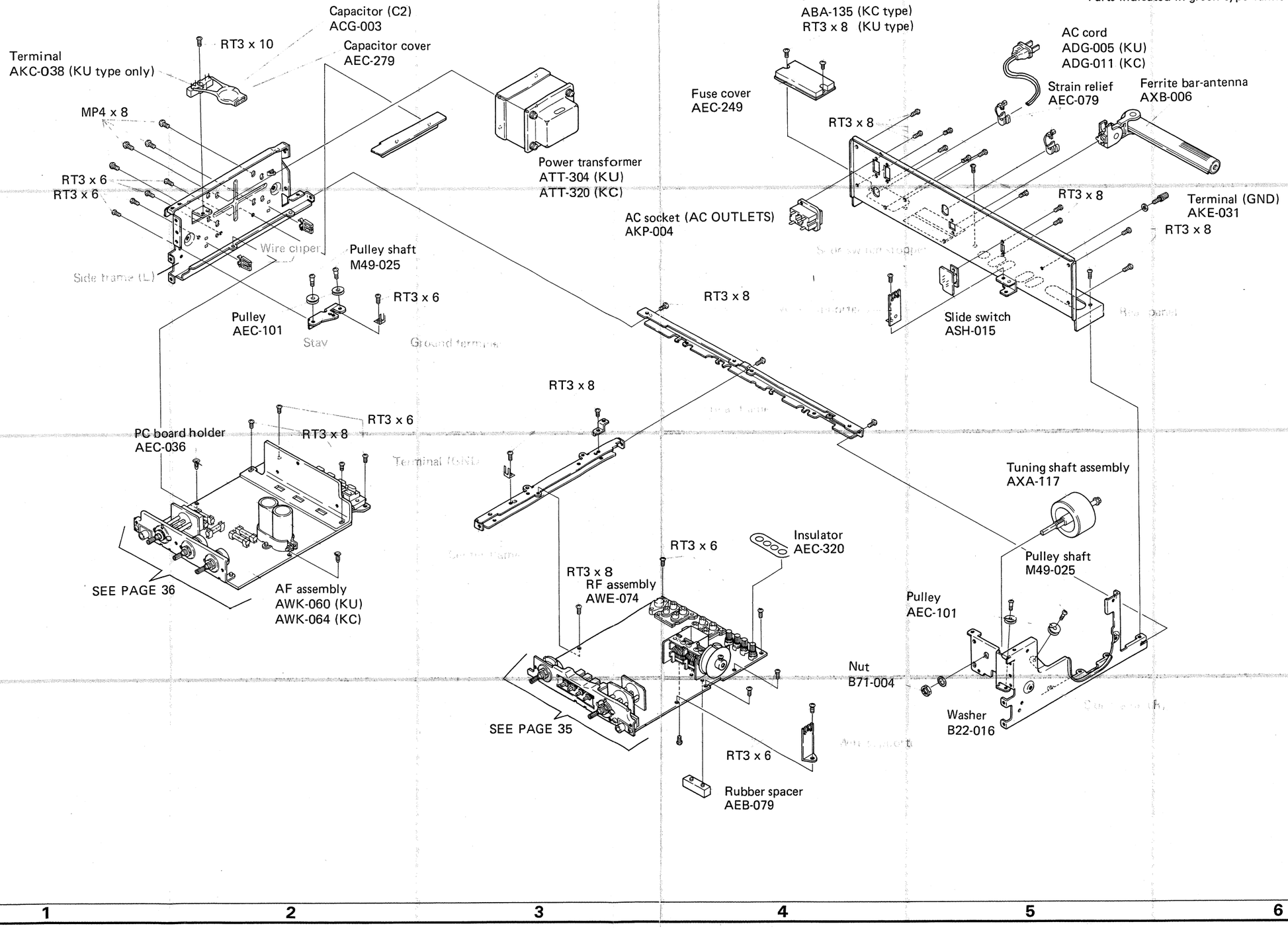
NOTE:
Parts indicated in green type cannot be supplied.

## 12.1 EXTERIOR



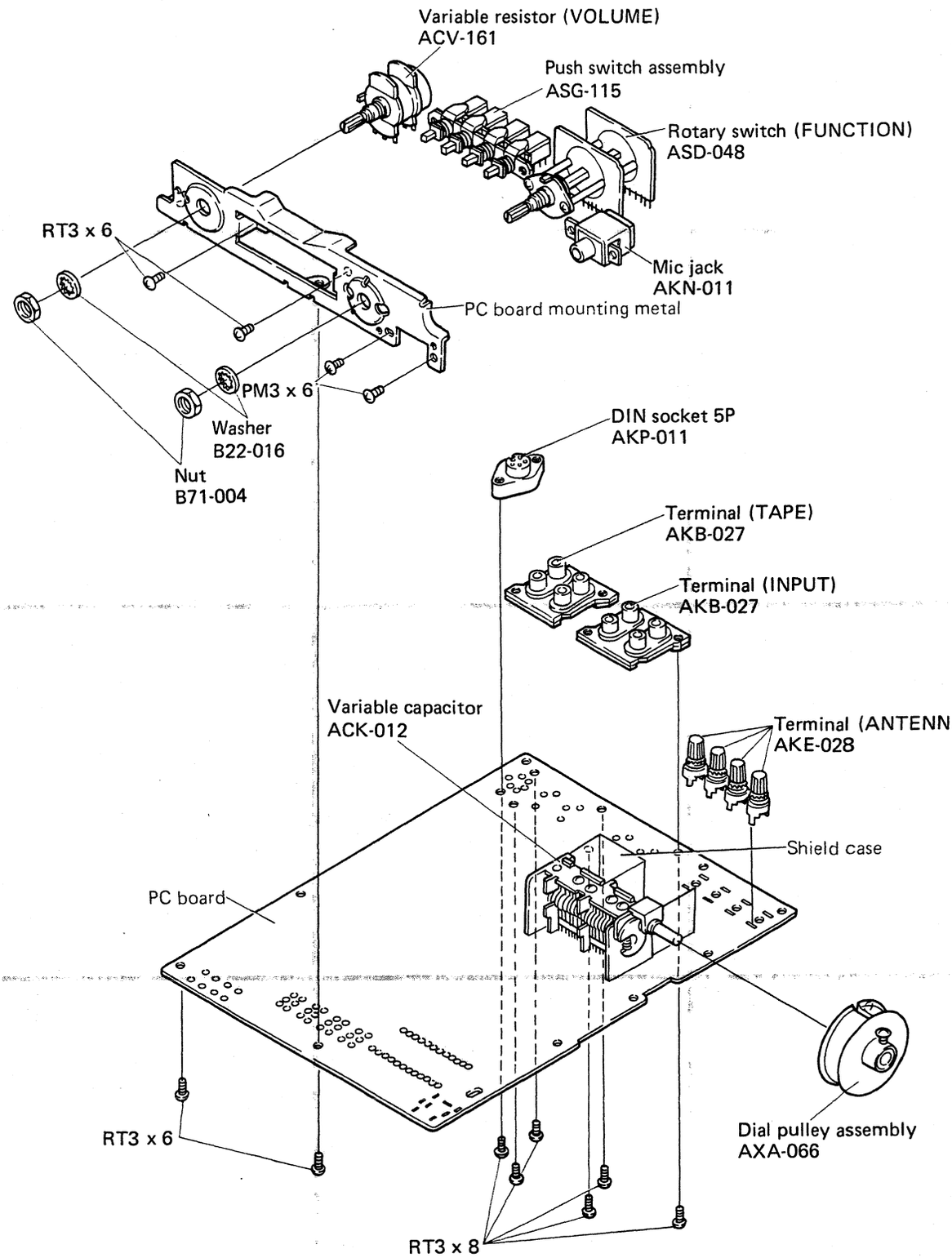
## 12.2 PART 1 (REAR PANEL)

NOTE:
Parts indicated in green type cannot be supplied.



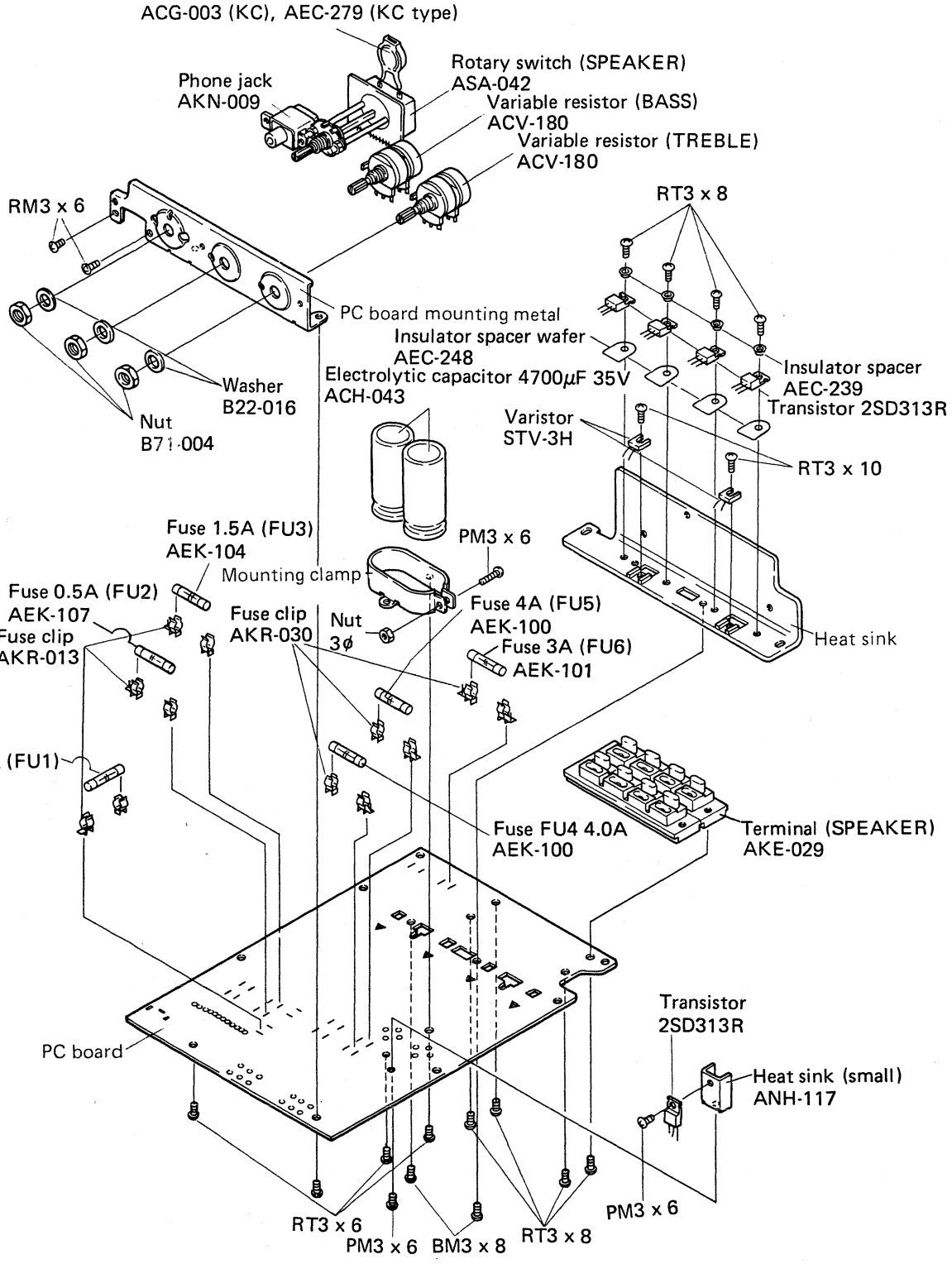
## 12.3 RF ASSEMBLY (AWE-074)

NOTE:
Parts indicated in green type cannot be supplied.



## 12.3 AF ASSEMBLY (AWK-060) KU Type (AWK-064) KC TYPE

NOTE:
Parts indicated in green type cannot be supplied.



# 13. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LISTS

*NOTE:*
*Capacitors: in μF unless otherwise noted p : pF*
*Resistors: in Ω, 1/4W unless otherwise noted k : kΩ, M : MΩ*

## 13.1 MISCELLANEOUS PARTS LIST

### KU TYPE

#### LAMPS

| Symbol | Description | Part No. |
|---|---|---|
| PL1 | Lamp assembly | AEL-060 |
| PL2 | Lamp assembly | AEL-060 |
| PL3 | Lamp assembly | AEL-060 |
| PL4 | Lamp with leads | AEL-062 |
| PL5 | Lamp with leads | AEL-061 |

#### FUSES

| Symbol | Description | | Part No. |
|---|---|---|---|
| FU1 | Fuse | 0.5A | AEK-107 |
| FU2 | Fuse | 0.5A | AEK-107 |
| FU3 | Fuse | 1.5A | AEK-104 |
| FU4 | Fuse | 4A | AEK-100 |
| FU5 | Fuse | 4A | AEK-100 |
| FU6 | Fuse | 3A | AEK-101 |

#### COIL AND TRANSFORMER

| Symbol | Description | Part No. |
|---|---|---|
| | Ferrite bar antenna | AXB-006 |
| | Power transformer | ATT-304 |

#### RESISTOR

| Symbol | Description | Part No. |
|---|---|---|
| VR1 | Variable resistor (BALANCE 1MΩ) | ACV-020 |

#### CAPACITORS

| Symbol | Description | | | Part No. |
|---|---|---|---|---|
| C1 | Ceramic | 0.01 | 250V | ACG-001 |
| C2 | Ceramic | 0.01 | 125V | ACG-003 |

### KC TYPE

#### LAMPS

| Symbol | Description | Part No. |
|---|---|---|
| PL1 | Lamp assembly | AEL-060 |
| PL2 | Lamp assembly | AEL-060 |
| PL3 | Lamp assembly | AEL-060 |
| PL4 | Lamp with leads | AEL-062 |
| PL5 | Lamp with leads | AEL-061 |

#### FUSES

| Symbol | Description | | Part No. |
|---|---|---|---|
| FU1 | Fuse | 0.5A | AEK-107 |
| FU2 | Fuse | 0.5A | AEK-107 |
| FU3 | Fuse | 1.5A | AEK-104 |
| FU4 | Fuse | 4A | AEK-100 |
| FU5 | Fuse | 4A | AEK-100 |
| FU6 | Fuse | 3A | AEK-101 |

#### COIL AND TRANSFORMER

| Symbol | Description | Part No. |
|---|---|---|
| | Ferrite bar antenna | AXB-006 |
| | Power transformer | ATT-320 |

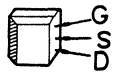
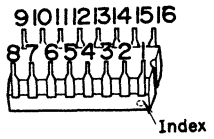
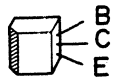
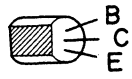
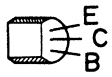
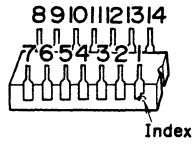
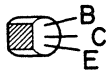
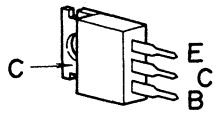
#### RESISTOR

| Symbol | Description | Part No. |
|---|---|---|
| VR1 | Variable resistor (BALANCE 1MΩ) | ACV-020 |

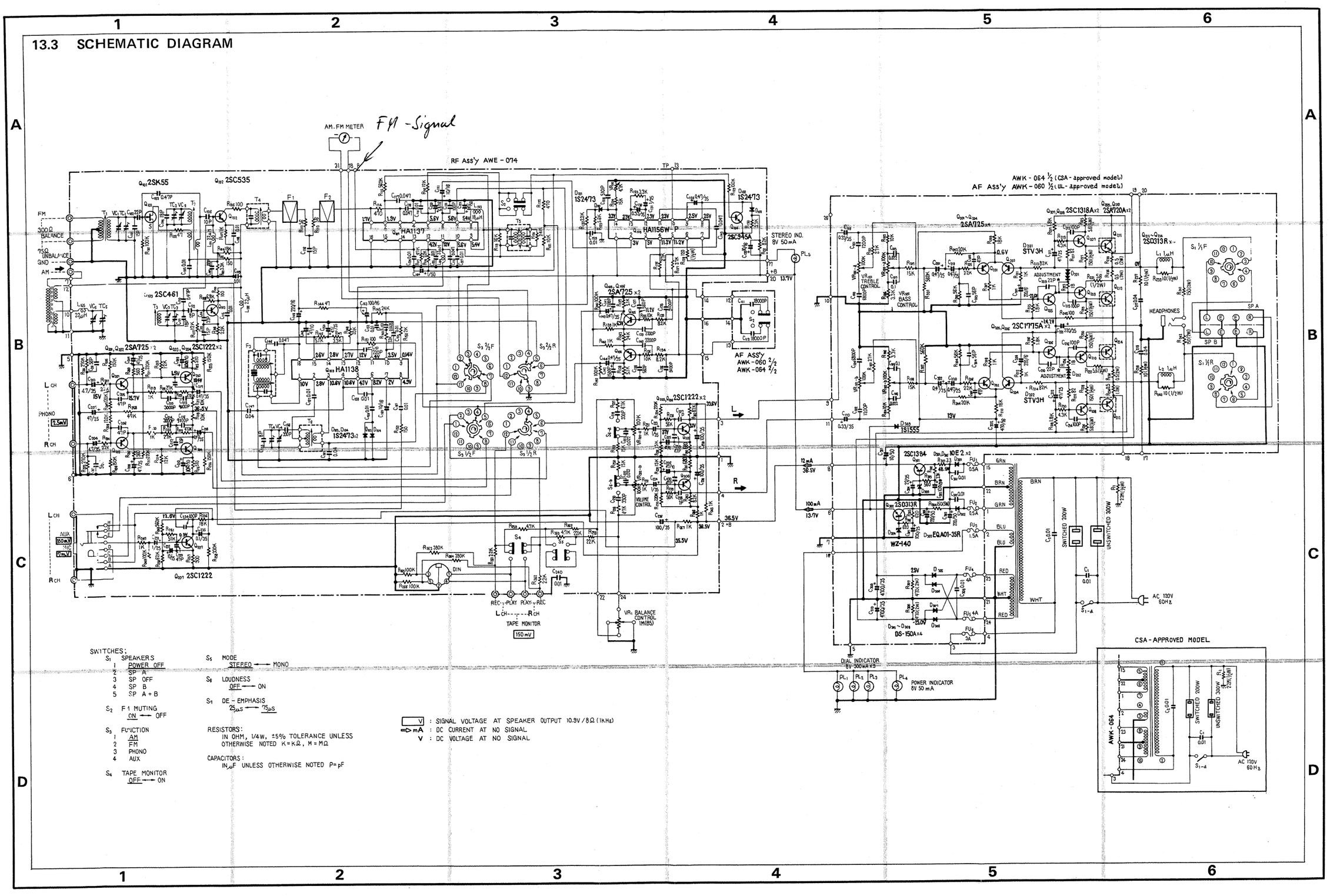
#### CAPACITORS

| Symbol | Description | | | Part No. |
|---|---|---|---|---|
| C1 | Ceramic | 0.01 | 125V | ACG-003 |
| C2 | Ceramic | 0.01 | 125V | ACG-003 |

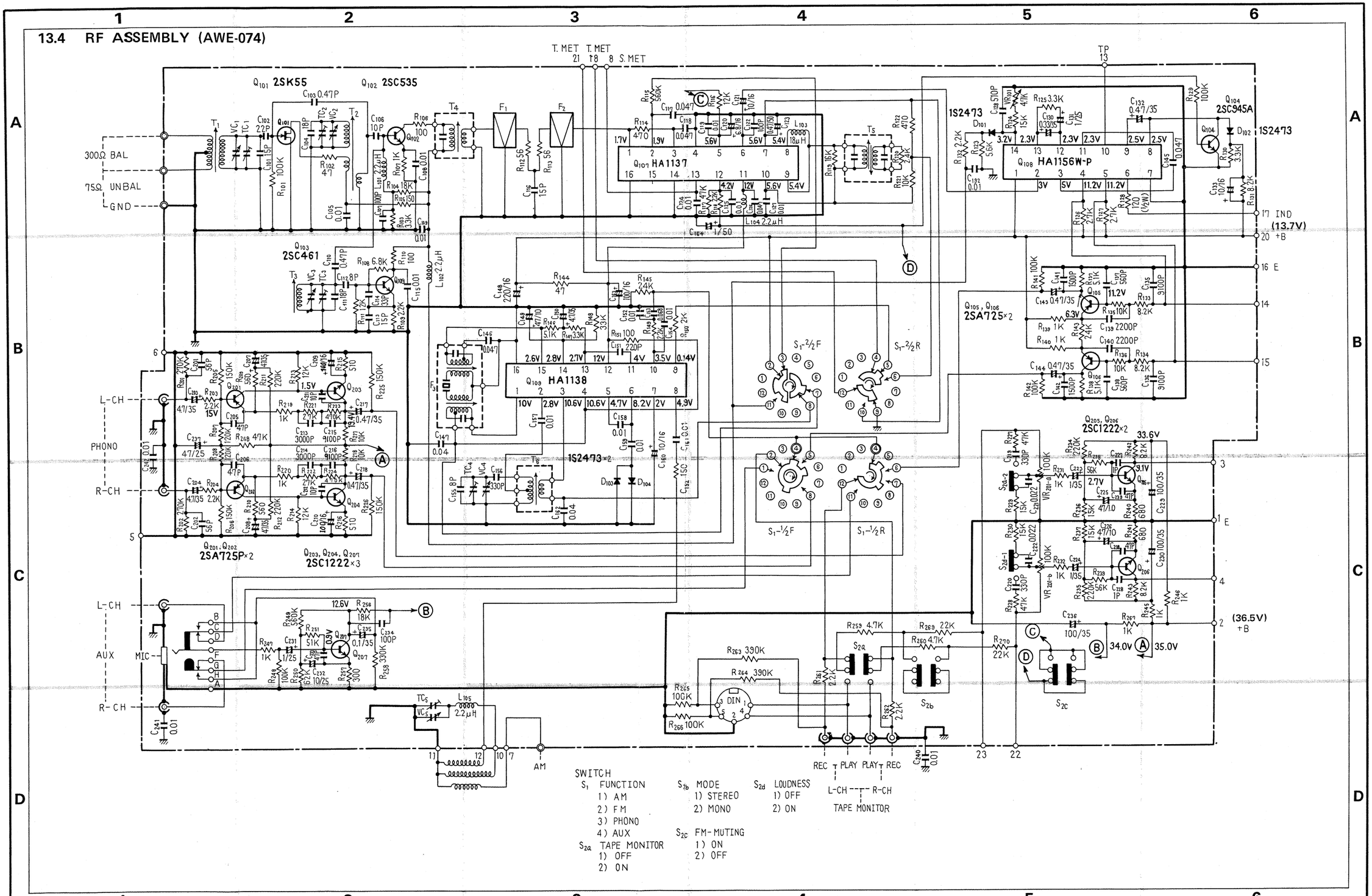
## 13.2 EXTERIOR VIEW OF TRANSISTORS AND ICS

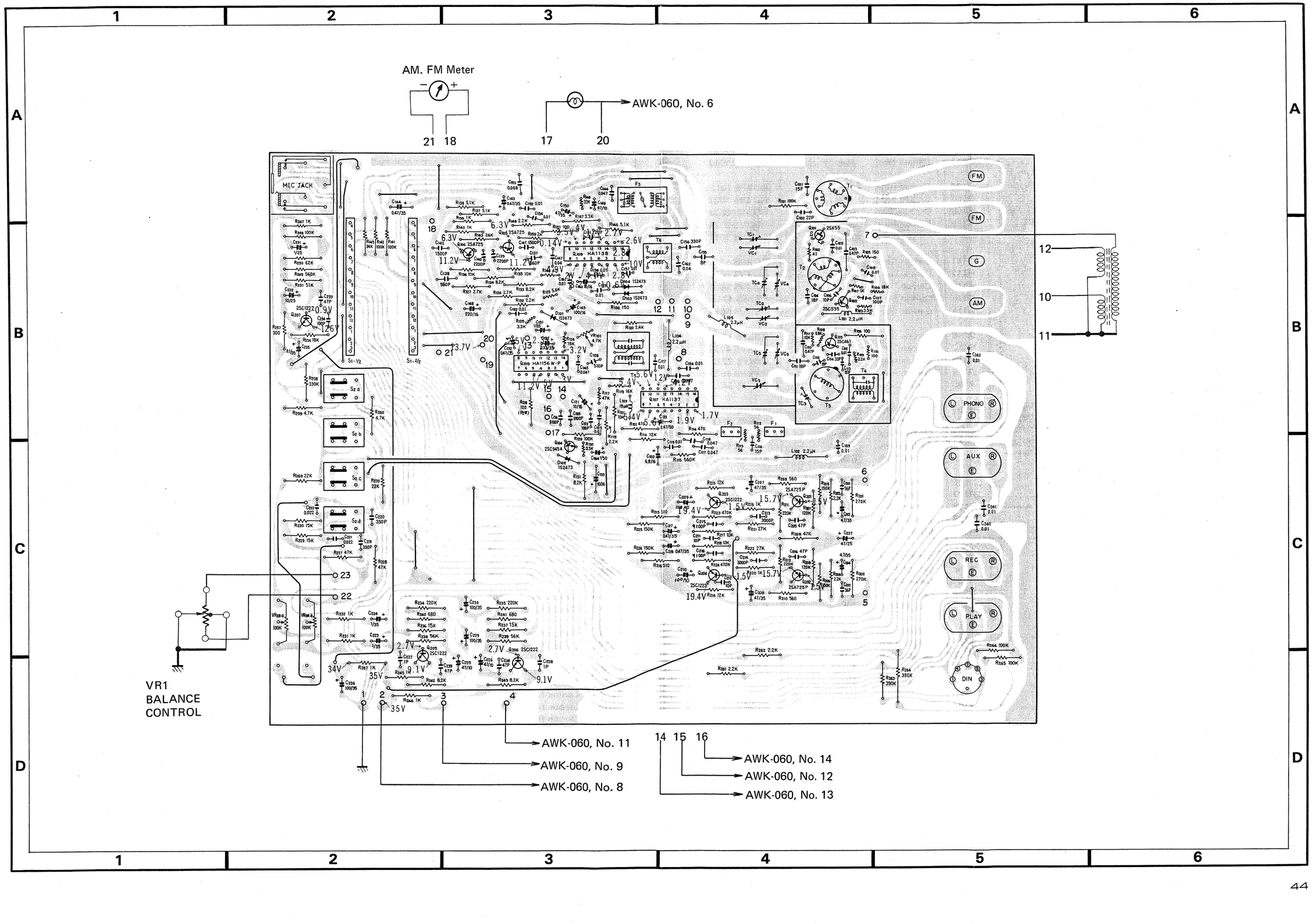
| | |
|---|---|
| 2SK55   | HA1137<br>HA1138   |
| 2SC535   | 2SC1384   |
| 2SA725   | HA1156   |
| 2SC1222<br>2SC945A<br>2SC1318A<br>2SA720A<br>2SC1775A   | 2SD313R   |

## 13.3 SCHEMATIC DIAGRAM



## 13.4 RF ASSEMBLY (AWE-074)




AM. FM Meter
21 18
17 20
AWK-060, No. 6
MIC JACK
VR1
BALANCE
CONTROL
AWK-060, No. 11
AWK-060, No. 9
AWK-060, No. 8
14 15 16
AWK-060, No. 14
AWK-060, No. 12
AWK-060, No. 13
12
10
11
7
FM
FM
G
AM
PHONO
AUX
REC
PLAY
DIN

## Parts List of RF Assembly (AWE-074)

### SEMICONDUCTORS

| Symbol | Description | Part No. |
|---|---|---|
| Q101 | FET | 2SK55-D |
| Q102 | Transistor | 2SC535-A |
| Q103 | Transistor | 2SC461-B |
| Q104 | Transistor | 2SC945A-Q |
| Q105 | Transistor | 2SA725-F (2SA842-BL) |
| Q106 | Transistor | 2SA725-F (2SA842-BL) |
| Q107 | IC | HA1137 |
| Q108 | IC | HA1156W-P |
| Q109 | IC | HA1138 |
| Q201 | Transistor | 2SA725P-F |
| Q202 | Transistor | 2SA725P-F |
| Q203 | Transistor (or 2SC1919) | 2SC1222-U |
| Q204 | Transistor (or 2SC1919) | 2SC1222-U |
| Q205 | Transistor (or 2SC1919) | 2SC1222-U |
| Q206 | Transistor (or 2SC1919) | 2SC1222-U |
| Q207 | Transistor (or 2SC1919) | 2SC1222-U |
| D101 | Diode | 1S2473 (1S2076) |
| D102 | Diode | 1S2473 (1S2076) |
| D103 | Diode | 1S2473 (1S2076) |
| D104 | Diode | 1S2473 (1S2076) |

### SWITCHES AND COILS

| Symbol | Description | Part No. |
|---|---|---|
| S1 | Rotary Switch (FUNCTION) | ASD-048 |
| S2 | Push Switch assembly (TAPE MONITOR) (MODE) (FM-MUTING) (LOUDNESS) | ASG-115 |
| T1 | FM antenna coil | ATC-030 |
| T2 | FM RF coil | ATC-024 |
| T3 | FM oscilator coil | ATC-025 |
| T4 | FM matching transformer | ATE-026 |
| T5 | FM IF transformer | T73-035 |
| T6 | AM oscilator coil | ATB-013 |
| F1 | FM ceramic filter | ATF-013 |
| F2 | FM ceramic filter | ATF-013 |
| F3 | AM ceramic filter | ATF-027 |
| L101 | RF choke coil 2.2μH | T24-028 |
| L102 | RF choke coil 2.2μH | T24-028 |
| L103 | Micro inductor 18μH | ATH-007 |
| L104 | RF choke coil 2.2μH | T24-028 |
| L105 | RF choke coil 2.2μF | T24-028 |

### RESISTORS

| Symbol | Description | Part No. |
|---|---|---|
| R101 | Carbon film 100k | RD¼PS 104J |
| R102 | Carbon film 47 | RD¼PS 470J |
| R103 | Carbon film 3.3k | RD¼VS 332J |
| R104 | Carbon film 18k | RD¼VS 183J |
| R105 | Carbon film 150 | RD¼VS 151J |
| R106 | Carbon film 100 | RD¼PS 101J |
| R107 | Carbon film 1k | RD¼VS 102J |
| R108 | Carbon film 6.8k | RD¼VS 682J |
| R109 | Carbon film 2.2k | RD¼VS 222J |
| R110 | Carbon film 100 | RD¼VS 101J |
| R111 | Carbon film 12k | RD¼VS 123J |
| R112 | Carbon film 56 | RD¼VS 560J |
| R113 | Carbon film 56 | RD¼VS 560J |
| R114 | Carbon film 470 | RD¼PS 471J |
| R115 | Carbon film 560k | RD¼VS 564J |
| R116 | Carbon film 12k | RD¼PS 123J |
| R117 | Carbon film 47k | RD¼VS 473J |
| R118 | Carbon film 2.2k | RD¼PS 222J |
| R119 | Carbon film 16k | RD¼VS 163J |
| R120 | Carbon film 2.4k | RD¼PS 242J |
| R121 | Carbon film 10k | RD¼PS 103J |
| R122 | Carbon film 470 | RD¼PS 471J |
| R123 | Carbon film 5.6k | RD¼VS 562J |
| R124 | Carbon film 15k | RD¼VS 153J |
| R125 | Carbon film 3.3k | RD¼VS 332J |
| R126 | Carbon film 2.7k | RD¼PS 272J |
| R127 | Carbon film 2.7k | RD¼PS 272J |
| R128 | Carbon film 120 ½W | RD½PS 121J |
| R129 | Carbon film 100k | RD¼PS 104J |
| R130 | Carbon film 3.3k | RD¼VS 332J |
| R131 | Carbon film 8.2k | RD¼PS 822J |
| R132 | Carbon film 2.2k | RD¼PS 222J |
| R133 | Carbon film 8.2k | RD¼PS 822J |
| R134 | Carbon film 8.2k | RD¼PS 822J |
| R135 | Carbon film 10k | RD¼PS 103J |
| R136 | Carbon film 10k | RD¼PS 103J |
| R137 | Carbon film 5.1k | RD¼PS 512J |
| R138 | Carbon film 5.1k | RD¼PS 512J |
| R139 | Carbon film 1k | RD¼PS 102J |
| R140 | Carbon film 1k | RD¼PS 102J |
| R141 | Carbon film 100k | RD¼PS 104J |
| R142 | Carbon film 100k | RD¼PS 104J |
| R143 | Carbon film 24k | RD¼PS 243J |
| R144 | Carbon film 47 | RD¼VS 470J |
| R145 | Carbon film 24k | RD¼PS 243J |
| R146 | Carbon film 5.1k | RD¼PS 512J |
| R147 | Carbon film 3.3k | RD¼PS 332J |
| R148 | Carbon film 33k | RD¼VS 333J |
| R149 | Carbon film 2.2k | RD¼PS 222J |
| R150 | Carbon film 2k | RD¼PS 202J |

| Symbol | Description | Part No. |
|---|---|---|
| R151 | Carbon film 100 | RD¼PS 101J |
| R152 | Carbon film 150 | RD¼PS 151J |
| R201 | Carbon film 270k | RD¼PS 274J |
| R202 | Carbon film 270k | RD¼PS 274J |
| R203 | Carbon film 2.2k | RD¼PS 222J |
| R204 | Carbon film 2.2k | RD¼PS 222J |
| R205 | Carbon film 150k | RD¼PS 154JNL |
| R206 | Carbon film 150k | RD¼PS 154JNL |
| R207 | Carbon film 120k | RD¼PS 124JNL |
| R208 | Carbon film 120k | RD¼PS 124JNL |
| R209 | Carbon film 560 | RD¼PS 561J |
| R210 | Carbon film 560 | RD¼PS 561J |
| R211 | Carbon film 220k | RD¼PS 224J |
| R212 | Carbon film 220k | RD¼PS 224J |
| R213 | Carbon film 12k | RD¼PS 123J |
| R214 | Carbon film 12k | RD¼PS 123J |
| R215 | Carbon film 510 | RD¼PS 511J |
| R216 | Carbon film 510 | RD¼PS 511J |
| R217 | Carbon film 10k | RD¼PS 103J |
| R218 | Carbon film 10k | RD¼PS 103J |
| R219 | Carbon film 1k | RD¼PS 102J |
| R220 | Carbon film 1k | RD¼PS 102J |
| R221 | Carbon film 27k | RD¼PS 273J |
| R222 | Carbon film 27k | RD¼PS 273J |
| R223 | Carbon film 470k | RD¼PS 474J |
| R224 | Carbon film 470k | RD¼PS 474J |
| R225 | Carbon film 150k | RD¼PS 154J |
| R226 | Carbon film 150k | RD¼PS 154J |
| R227 | Carbon film 47k | RD¼PS 473J |
| R228 | Carbon film 47k | RD¼PS 473J |
| R229 | Carbon film 15k | RD¼PS 153J |
| R230 | Carbon film 15k | RD¼PS 153J |
| R231 | Carbon film 1k | RD¼PS 102J |
| R232 | Carbon film 1k | RD¼PS 102J |
| R233 | | |
| R234 | Carbon film 220k | RD¼PS 224J |
| R235 | Carbon film 220k | RD¼PS 224J |
| R236 | Carbon film 15k | RD¼PS 153J |
| R237 | Carbon film 15k | RD¼PS 153J |
| R238 | Carbon film 56k | RD¼PS 563J |
| R239 | Carbon film 56k | RD¼PS 563J |
| R240 | Carbon film 680 | RD¼PS 681J |
| R241 | Carbon film 680 | RD¼PS 681J |
| R242 | Carbon film 8.2k | RD¼PS 822J |
| R243 | Carbon film 8.2k | RD¼PS 822J |
| R244 | | |
| R245 | Carbon film 1k | RD¼PS 102J |
| R246 | Carbon film 1k | RD¼PS 102J |
| R247 | Carbon film 1k | RD¼PS 102J |

| Symbol | Description | Part No. |
|---|---|---|
| R248 | Carbon film 100k | RD¼PS 104J |
| R249 | Carbon film 560k | RD¼PS 564J |
| R250 | Carbon film 62k | RD¼PS 623J |
| R251 | Carbon film 51k | RD¼PS 513J |
| R256 | Carbon film 18k | RD¼PS 183J |
| R257 | Carbon film 300 | RD¼PS 301J |
| R258 | Carbon film 330k | RD¼PS 334J |
| R259 | Carbon film 4.7k | RD¼PS 472J |
| R260 | Carbon film 4.7k | RD¼PS 472J |
| R261 | Carbon film 2.2k | RD¼PS 222J |
| R262 | Carbon film 2.2k | RD¼PS 222J |
| R263 | Carbon film 390k | RD¼PS 394J |
| R264 | Carbon film 390k | RD¼PS 394J |
| R265 | Carbon film 100k | RD¼PS 104J |
| R266 | Carbon film 100k | RD¼PS 104J |
| R267 | Carbon film 1k | RD¼PS 102J |
| R268 | Carbon film 47k | RD¼PS 473J |
| R269 | Carbon film 22k | RD¼PS 223J |
| R270 | Carbon film 22k | RD¼PS 223J |

### CAPACITORS

| Symbol | Description | Part No. |
|---|---|---|
| C101 | Ceramic 15p 50V | CCDSH 150K 50 |
| C102 | Ceramic 22p 50V | CCDSL 220K 50 |
| C103 | Ceramic 0.47p 500V | CGB R47K500 |
| C104 | Ceramic 18p 50V | CCDTH 180K 50 |
| C105 | Ceramic 0.01 50V | CKDYF 103Z 50 |
| C106 | Ceramic 10p 50V | CCDSL 100K 50 |
| C107 | Ceramic 100p 50V | CCDSL 101K 50 |
| C108 | Ceramic 0.01 50V | CKDYF 103Z 50 |
| C109 | Ceramic 0.01 50V | CKDYF 103Z 50 |
| C110 | Ceramic 0.47p 500V | CGB R47K500 |
| C111 | Ceramic 18p 50V | CCDPH 180K 50 |
| C112 | Ceramic 8p 50V | CCDSH 080F 50 |
| C113 | Ceramic 15p 50V | CCDCH 150K 50 |
| C114 | Ceramic 33p 50V | CCDCH 330K 50 |
| C115 | Ceramic 0.01 50V | CKDYB 103K 50 |
| C116 | Ceramic 15p 50V | CCDSL 150K 50 |
| C117 | Ceramic 0.047 50V | CKDYF 473Z 50 |
| C118 | Ceramic 0.047 50V | CKDYF 473Z 50 |
| C119 | Ceramic 0.01 50V | CKDYF 103Z 50 |
| C120 | Electrolytic 6.8 16V | CSZA 6R8M 16 |
| C121 | Electrolytic 10 16V | CEA 100P 16 |
| C122 | Ceramic 100p 50V | CCDSL 101K 50 |
| C123 | Electrolytic 0.47 50V | CEA R47P 50 |

| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| C124 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C125 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C126 | Ceramic | 0.047 | 50V | CKDYF 473Z | 50 |
| C127 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C128 | Polystyrene film | 510p | 50V | CQSH 511J | 50 |
| C129 | Polystyrene film | | | | |
| C130 | Electrolytic | 0.33 | 35V | CSZA R33M | 35 |
| C131 | Electrolytic | 1 | 25V | CSZA 010M | 25 |
| C132 | Electrolytic | 0.47 | 35V | CSZA R47M | 35 |
| C133 | Electrolytic | 10 | 16V | CEA 100p | 16 |
| C135 | Ceramic | 9100p | 50V | CKDYA 912J | 50 |
| C136 | Ceramic | 9100p | 50V | CKDYA 912J | 50 |
| C137 | Ceramic | 560p | 50V | CKDYB 561K | 50 |
| C138 | Ceramic | 560p | 50V | CKDYB 561K | 50 |
| C139 | Ceramic | 2200p | 50V | CKDYB 222K | 50 |
| C140 | Ceramic | 2200p | 50V | CKDYB 222K | 50 |
| C141 | Ceramic | 1500p | 50V | CKDYB 152K | 50 |
| C142 | Ceramic | 1500p | 50V | CKDYB 152K | 50 |
| C143 | Electrolytic | 0.47 | 35V | CSZA R47M | 35 |
| C144 | Electrolytic | 0.47 | 35V | CSZA R47M | 35 |
| C145 | Mylar | 0.047 | 50V | CQMA 473J | 50 |
| C146 | Ceramic | 0.047 | 50V | CKDYF 473Z | 50 |
| C147 | Ceramic | 0.04 | 50V | CKDYF 403Z | 50 |
| C148 | Electrolytic | 220 | 16V | CEA 221p | 16 |
| C149 | Electrolytic | 47 | 10V | CEA 470P | 10 |
| C150 | Electrolytic | 4.7 | 35V | CEA 4R7P | 35 |
| C151 | Ceramic | 220p | 50V | CCDSL 221K | 50 |
| C152 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C153 | Mylar | 0.068 | 50V | CQMA 683J | 50 |
| C154 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C155 | Ceramic | 8p | 50V | CCDZL 080F | 50 |
| C156 | Polystyrene film | 330p | 50V | CQSA 331J | 50 |
| C157 | Ceramic | 0.01 | 50V | CKDYB 103K | 50 |
| C158 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C159 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C160 | Electrolytic | 10 | 16V | CEA 100P | 16 |
| C161 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C162 | Ceramic | 0.04 | 50V | CKDYF 403Z | 50 |
| C163 | Electrolytic | 100 | 16V | CEA 101P | 16 |
| C164 | Electrolytic | 1 | 50V | CEA 010P | 50 |
| C201 | Ceramic | 56p | 50V | CCDSL 560K | 50 |
| C202 | Ceramic | 56p | 50V | CCDSL 560K | 50 |
| C203 | Electrolytic | 4.7 | 35V | CSZA 4R7M | 35 |
| C204 | Electrolytic | 4.7 | 35V | CSZA 4R7M | 35 |
| C205 | Ceramic | 47p | 50V | CCDSL 470K | 50 |
| C206 | Ceramic | 47p | 50V | CCDSL 470K | 50 |
| C207 | Electrolytic | 47 | 35V | CEA 470P | 35 |
| C208 | Electrolytic | 47 | 35V | CEA 470P | 35 |
| C209 | Electrolytic | 100 | 10V | CEA 101P | 10 |
| C210 | Electrolytic | 100 | 10V | CEA 101P | 10 |

| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| C211 | Ceramic | 10p | 50V | CCDSL 100F | 50 |
| C212 | Ceramic | 10p | 50V | CCDSL 100F | 50 |
| C213 | Ceramic | 3000p | 50V | CKDYA 302J | 50 |
| C214 | Ceramic | 3000p | 50V | CKDYA 302J | 50 |
| C215 | Ceramic | 9100p | 50V | CKDYA 912J | 50 |
| C216 | Ceramic | 9100p | 50V | CKDYA 912J | 50 |
| C217 | Electrolytic | 0.47 | 35V | CSZA R47M | 35 |
| C218 | Electrolytic | 0.47 | 35V | CSZA R47M | 35 |
| C219 | Ceramic | 330p | 50V | CCDSL 331K | 50 |
| C220 | Ceramic | 330p | 50V | CCDSL 331K | 50 |
| C221 | Mylar | 0.022 | 50V | CQMA 223J | 50 |
| C222 | Mylar | 0.022 | 50V | CQMA 223J | 50 |
| C223 | Electrolytic | 1 | 35V | CSZA 010M | 35 |
| C224 | Electrolytic | 1 | 35V | CSZA 010M | 35 |
| C225 | Electrolytic | 47 | 10V | CEA 470p | 10 |
| C226 | Electrolytic | 47 | 10V | CEA 470P | 10 |
| C227 | Ceramic | 1p | 50V | CCDSL 010K | 50 |
| C228 | Ceramic | 1p | 50V | CCDSL 010K | 50 |
| C229 | Electrolytic | 100 | 35V | CEA 101P | 35 |
| C230 | Electrolytic | 100 | 35V | CEA 101P | 35 |
| C231 | Electrolytic | 1 | 25V | CSZA 010M | 25 |
| C232 | Electrolytic | 10 | 25V | CEA 100P | 25 |
| C233 | Ceramic | 47p | 50V | CCDSL 470K | 50 |
| C234 | Ceramic | 100p | 50V | CCDSL 101K | 50 |
| C235 | Electrolytic | 0.1 | 35V | CSZA 0R1M | 35 |
| C236 | Electrolytic | 100 | 35V | CEA 101P | 35 |
| C237 | Electrolytic | 47 | 25V | CEA 470P | 25 |
| C238 | Ceramic | 47p | 50V | CCDSL 470K | 50 |
| C239 | Ceramic | 47p | 50V | CCDSL 470K | 50 |
| C240 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C241 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |
| C242 | Ceramic | 0.01 | 50V | CKDYF 103Z | 50 |

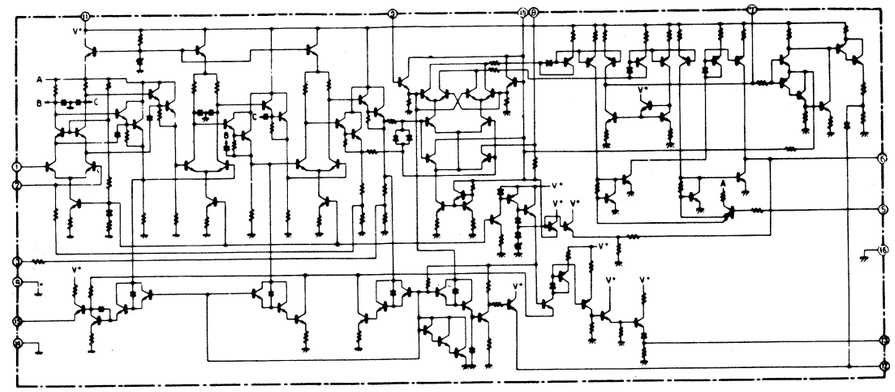
## OTHERS

| Symbol | Description | Part No. |
|---|---|---|
| | 5P DIN type | AKP-011 |
| | Terminal (INPUT, TAPE) | AKB-027 |
| VR101 | Semi fixed Volume | C92-051 |
| VR201 | Variable resistor (VOLUME) | ACV-161 |
| | Variable capacitor | ACK-012 |
| | Semi fixed VC. | ACM-006 |
| | Phone jack (MIC) | AKN-011 |

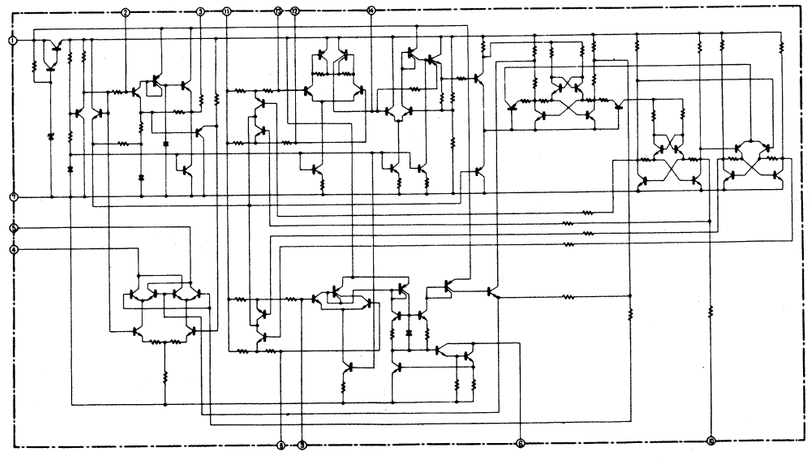


## Circuit Diagram of ICs

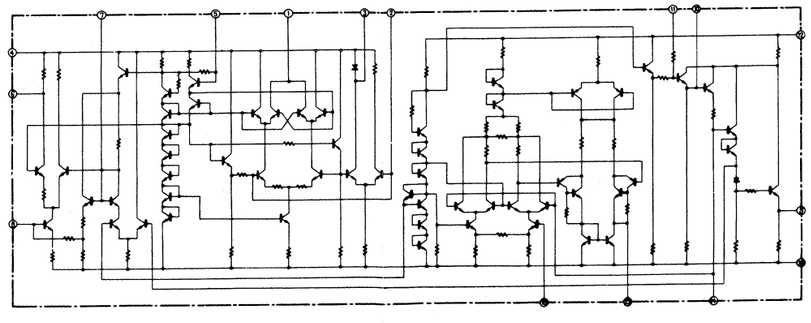
### HA1137 (FM IF IC)



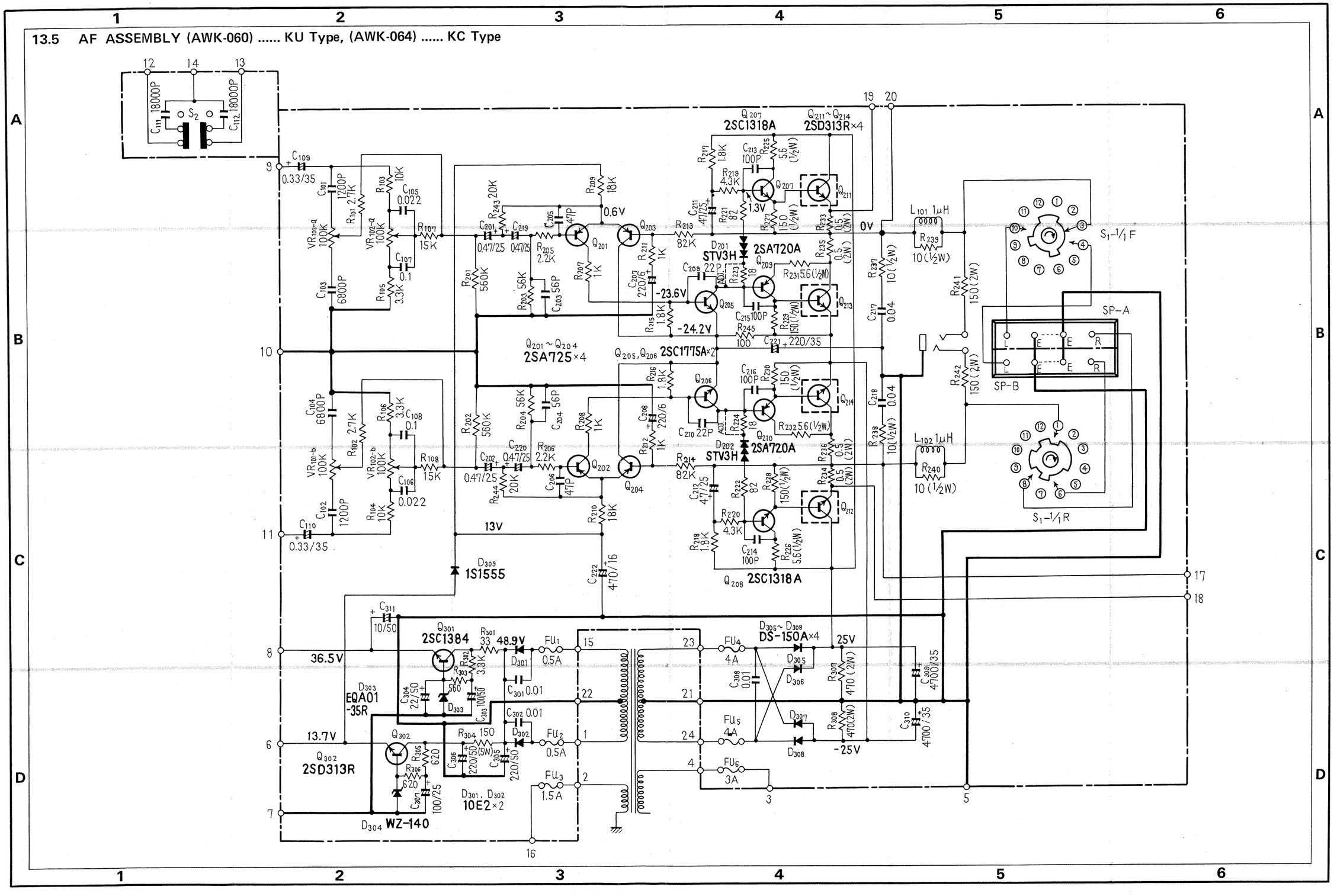
### HA1156 (FM MPX IC)

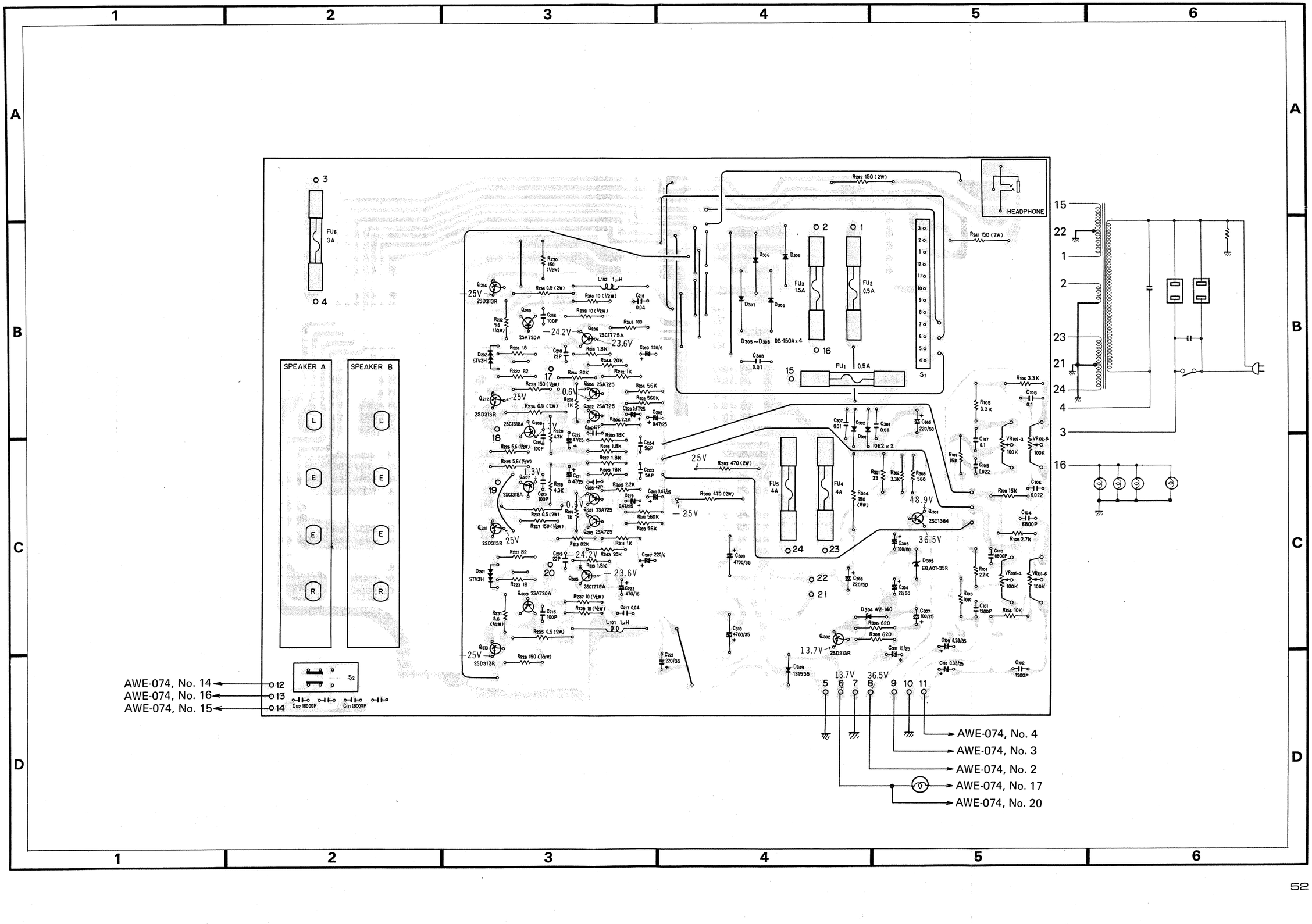


### HA1138 (AM IC)



## 13.5 AF ASSEMBLY (AWK-060) ..... KU Type, (AWK-064) ..... KC Type




1
2
3
4
5
6
A
B
C
D
FU6 3A
SPEAKER A
SPEAKER B
L
E
R
S2
AWE-074, No. 14
AWE-074, No. 16
AWE-074, No. 15
HEADPHONE
FU1 0.5A
FU2 0.5A
FU3 1.5A
FU4 4A
FU5 4A
S1
D305 ~ D308 DS-150A x 4
10E2 x 2
25V
24.2V
23.6V
1.3V
0.6V
48.9V
36.5V
13.7V
AWE-074, No. 4
AWE-074, No. 3
AWE-074, No. 2
AWE-074, No. 17
AWE-074, No. 20

## Parts List of AF Assembly (AWK-060)

### SEMICONDUCTORS

| Symbol | Description | Part No. |
|---|---|---|
| Q201 | Transistor | 2SA725-F (2SA640-F) |
| Q202 | Transistor | 2SA725-F (2SA640-F) |
| Q203 | Transistor | 2SA725-F (2SA640-F) |
| Q204 | Transistor | 2SA725-F (2SA640-F) |
| Q205 | Transistor | 2SC1775A-E |
| Q206 | Transistor | 2SC1775A-E |
| Q207 | Transistor | 2SC1318A-S (2SC1211-D) |
| Q208 | Transistor | 2SC1318A-S (2SC1211-D) |
| Q209 | Transistor | 2SA720A-S (2SA697-D) |
| Q210 | Transistor | 2SA720A-S (2SA697-D) |
| Q211 | Transistor | 2SD313R-D (2SD526-D) |
| Q212 | Transistor | 2SD313R-D (2SD526-D) |
| Q213 | Transistor | 2SD313R-D (2SD526-D) |
| Q214 | Transistor | 2SD313R-D (2SD526-D) |
| Q301 | Transistor | 2SC1384-Q |
| Q302 | Transistor | 2SD313R-D (2SD526-D) |
| D201 | Varistor | STV-3H |
| D202 | Varistor | STV-3H |
| D301 | Diode | 10E2 |
| D302 | Diode | 10E2 |
| D303 | Zener diode | EQA01-35R |
| D304 | Zener diode | WZ-140 |
| D305 | Diode | DS-150A (30D2) |
| D306 | Diode | DS-150A (30D2) |
| D307 | Diode | DS-150A (30D2) |
| D308 | Diode | DS-150A (30D2) |
| D309 | Diode | 1S1555 (1S2473) |

### SWITCHES AND COILS

| Symbol | Description | Part No. |
|---|---|---|
| | Rotary Switch (SPEAKERS) | ASA-042 |
| | Slide Switch (DE-EMPHASIS) | ASH-015 |
| L101 | AF choke coil 1μH | ATH-011 |
| L102 | AF choke coil 1μH | ATH-011 |

### RESISTORS

| Symbol | Description | Part No. |
|---|---|---|
| VR101 | Variable 100kΩ-A dual (TREBLE) | ACV-180 |
| VR102 | Variable 100kΩ-A dual (BASS) | ACV-180 |
| R101 | Carbon film 2.7k | RD¼PS 272J |
| R102 | Carbon film 2.7k | RD¼PS 272J |
| R103 | Carbon film 10k | RD¼PS 103J |
| R104 | Carbon film 10k | RD¼PS 103J |
| R105 | Carbon film 3.3k | RD¼PS 332J |
| R106 | Carbon film 3.3k | RD¼PS 332J |
| R107 | Carbon film 15k | RD¼PS 153J |
| R108 | Carbon film 15k | RD¼PS 153J |
| R201 | Carbon film 560k | RD¼PS 564J |
| R202 | Carbon film 560k | RD¼PS 564J |
| R203 | Carbon film 56k | RD¼PS 563J |
| R204 | Carbon film 56k | RD¼PS 563J |
| R205 | Carbon film 2.2k | RD¼PS 222J |
| R206 | Carbon film 2.2k | RD¼PS 222J |
| R207 | Carbon film 1k | RD¼PS 102J |
| R208 | Carbon film 1k | RD¼PS 102J |
| R209 | Carbon film 18k | RD¼PS 183J |
| R210 | Carbon film 18k | RD¼PS 183J |
| R211 | Carbon film 1k | RD¼PS 102J |
| R212 | Carbon film 1k | RD¼PS 102J |
| R213 | Carbon film 82k | RD¼PS 823J |
| R214 | Carbon film 82k | RD¼PS 823J |
| R215 | Carbon film 1.8k | RD¼PS 182J |
| R216 | Carbon film 1.8k | RD¼PS 182J |
| R217 | Carbon film 1.8k | RD¼PS 182J |
| R218 | Carbon film 1.8k | RD¼PS 182J |
| R219 | Carbon film 4.3k | RD¼PS 432J |
| R220 | Carbon film 4.3k | RD¼PS 432J |
| R221 | Carbon film 82 | RD¼PS 820J |
| R222 | Carbon film 82 | RD¼PS 820J |
| R223 | Carbon film 18 | RD¼PS 180J |
| R224 | Carbon film 18 | RD¼PS 180J |
| R225 | Carbon film 5.6 ½W | RD½PSF 5R6J |
| R226 | Carbon film 5.6 ½W | RD½PSF 5R6J |
| R227 | Carbon film 150 ½W | RD½PSF 151J |
| R228 | Carbon film 150 ½W | RD½PSF 151J |
| R229 | Carbon film 150 ½W | RD½PSF 151J |
| R230 | Carbon film 150 ½W | RD½PSF 151J |
| R231 | Carbon film 5.6 ½W | RD½PSF 5R6J |
| R232 | Carbon film 5.6 ½W | RD½PSF 5R6J |
| R233 | Metal film 0.5 2W | RN2H 0R5K |
| R234 | Metal film 0.5 2W | RN2H 0R5K |
| R235 | Metal film 0.5 2W | RN2H 0R5K |
| R236 | Metal film 0.5 2W | RN2H 0R5K |
| R237 | Carbon film 10 ½W | RD½PSF 100J |
| R238 | Carbon film 10 ½W | RD½PSF 100J |
| R239 | Carbon film 10 ½W | RD½PS 100J |
| R240 | Carbon film 10 ½W | RD½PS 100J |
| R241 | Metal oxide film 150 2W | RS2P 151J |
| R242 | Metal oxide film 150 2W | RS2P 151J |
| R243 | Carbon film 20k | RD¼PS 203J |
| R244 | Carbon film 20k | RD¼PS 203J |
| R245 | Carbon film 100 | RD¼PS 101J |
| R301 | Carbon film 33 | RD¼PSF 330J |
| R302 | Carbon film 3.3k | RD¼PS 332J |
| R303 | Carbon film 560 | RD¼PS 561J |
| R304 | Wire wound 150 5W | RT5B 151K |
| R305 | Carbon film 620 | RD¼PS 621J |
| R306 | Carbon film 620 | RD¼PS 621J |
| R307 | Metal oxide film 470 2W | RS2P 471J |
| R308 | Metal oxide film 470 2W | RS2P 471J |

### CAPACITORS

| Symbol | Description | Part No. |
|---|---|---|
| C101 | Ceramic 1200p 50V | CKDYA 122J 50 |
| C102 | Ceramic 1200p 50V | CKDYA 122J 50 |
| C103 | Ceramic 6800p 50V | CKDYA 682J 50 |
| C104 | Ceramic 6800p 50V | CKDYA 682J 50 |
| C105 | Mylar 0.022 50V | CQMA 223J 50 |
| C106 | Mylar 0.022 50V | CQMA 223J 50 |
| C107 | Mylar 0.1 50V | CQMA 104J 50 |
| C108 | Mylar 0.1 50V | CQMA 104J 50 |
| C109 | Electrolytic 0.33 35V | CSZA R33M 35 |
| C110 | Electrolytic 0.33 35V | CSZA R33M 35 |
| C111 | Mylar 0.018 50V | CQMA 183J 50 |
| C112 | Mylar 0.018 50V | CQMA 183J 50 |
| C201 | Electrolytic 0.47 25V | CSZA R47M 25 |
| C202 | Electrolytic 0.47 25V | CSZA R47M 25 |
| C203 | Ceramic 56p 50V | CCDSL 560K 50 |
| C204 | Ceramic 56p 50V | CCDSL 560K 50 |
| C205 | Ceramic 47p 50V | CCDSL 470K 50 |
| C206 | Ceramic 47p 50V | CCDSL 470K 50 |
| C207 | Electrolytic 220 6V | CEA 221P 6 |
| C208 | Electrolytic 220 6V | CEA 221P 6 |
| C209 | Ceramic 22p 50V | CCDSL 220K 50 |
| C210 | Ceramic 22p 50V | CCDSL 220K 50 |
| C211 | Electrolytic 47 25V | CEA 470P 25 |
| C212 | Electrolytic 47 25V | CEA 470P 25 |
| C213 | Ceramic 100p 50V | CCDSL 101K 50 |
| C214 | Ceramic 100p 50V | CCDSL 101K 50 |
| C215 | Ceramic 100p 50V | CCDSL 101K 50 |
| C216 | Ceramic 100p 50V | CCDSL 101K 50 |
| C217 | Ceramic 0.04 50V | CKDYF 403Z 50 |
| C218 | Ceramic 0.04 50V | CKDYF 403Z 50 |
| C219 | Electrolytic 0.47 25V | CSZA R47M 25 |
| C220 | Electrolytic 0.47 25V | CSZA R47M 25 |

| Symbol | Description | Part No. |
|---|---|---|
| C221 | Electrolytic 220 35V | CEA 221P 35 |
| C222 | Electrolytic 470 16V | CEA 471P 16 |
| C301 | Ceramic 0.01 150V | ACG-004 |
| C302 | Ceramic 0.01 150V | ACG-004 |
| C303 | Electrolytic 100 50V | CEA 101P 50 |
| C304 | Electrolytic 22 50V | CEA 220P 50 |
| C305 | Electrolytic 220 50V | CEA 221P 50 |
| C306 | Electrolytic 220 50V | CEA 221P 50 |
| C307 | Electrolytic 100 25V | CEA 101P 25 |
| C308 | Ceramic 0.01 150V | ACG-004 |
| C309 | Electrolytic 4700 35V | ACH-043 |
| C310 | Electrolytic 4700 35V | ACH-043 |
| C311 | Electrolytic 10 50V | CEA 100P 50 |

### OTHERS

| Symbol | Description | Part No. |
|---|---|---|
| | Heat sink (small) | ANH-117 |
| | Terminal (SPEAKERS) | AKE-029 |
| | Phone jack | AKN-009 |
| | Fuse clip | AKR-013 |
| | Fuse clip | AKR-030 |

## Parts List of AF Assembly (AWK-064)

*The AF Assembly (AWK-064) which are not the same as those used in AWK-060 are listed below.*

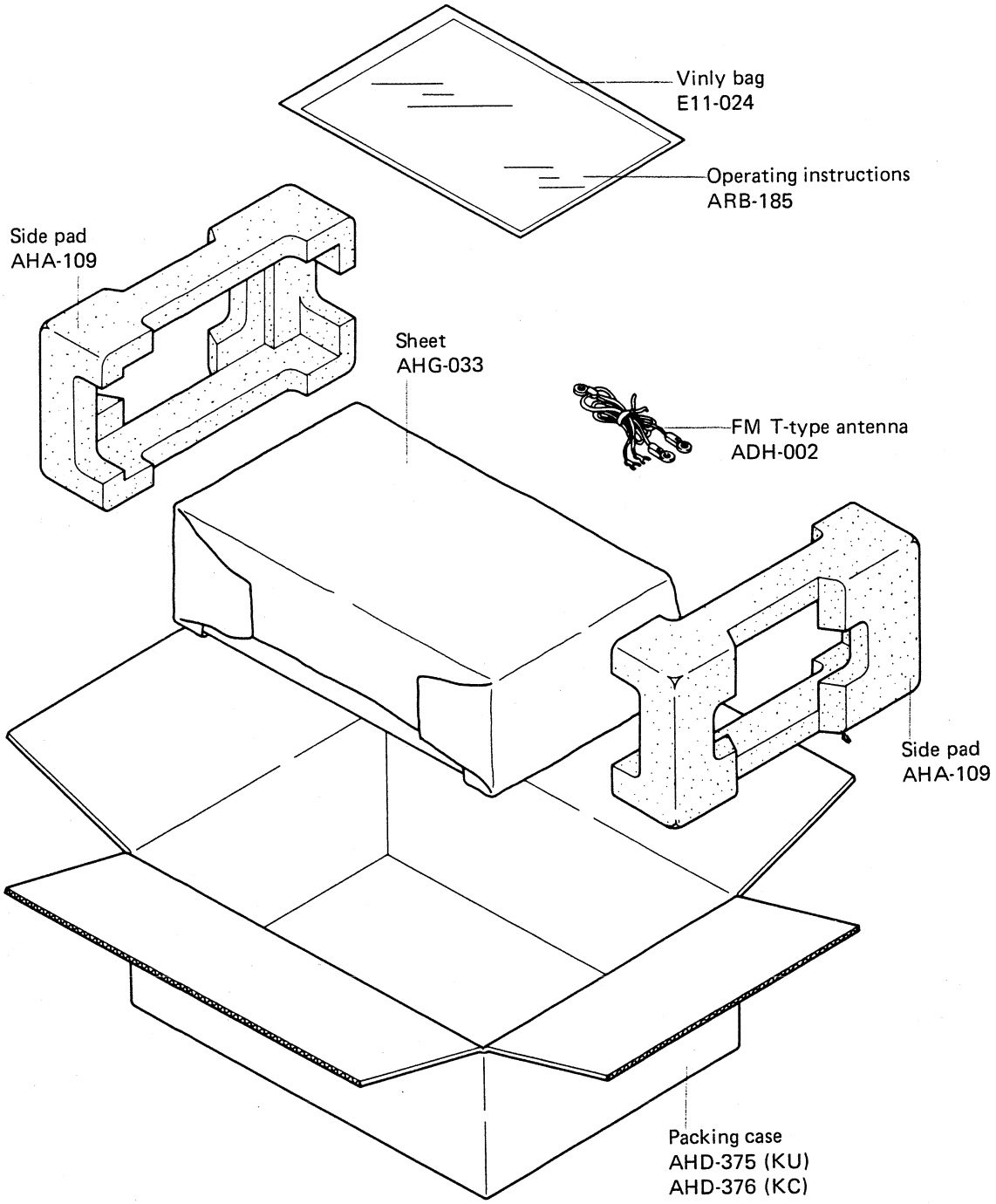
### RESISTORS

| Symbol | Description | Part No. |
|---|---|---|
| R239 | Carbon film 10 ½W | RD½PSF 100J |
| R240 | Caroon film 10 ½W | RD½PSF 100J |

### OTHERS

| Symbol | Description | Part No. |
|---|---|---|
| | Fuse clip | AKR-013 |

# 14. PACKING


Vinly bag
E11-024
Operating instructions
ARB-185
Side pad
AHA-109
Sheet
AHG-033
FM T-type antenna
ADH-002
Side pad
AHA-109
Packing case
AHD-375 (KU)
AHD-376 (KC)

# AM/FM STEREO RECEIVER

# SX-450

## HG, S

## Additional

# *Service Manual*

---

This Additional Service Manual provides only part that differ from those used in KU, KC types.

This Specifications of HG, S types are the same as KU, KC types except following section.

| | |
|---|---|
| Power Requirements | KU, KC, 120V 60Hz<br>HG; 220V/240V 50Hz<br>S; 110V/120V/220V/240V 50/60Hz |
| Power Consumption | UL; 70W, 130W (Max.)<br>120VA<br>HG, S; 130W |

# CONTRAST OF MISCELLANEOUS PART

## FUSES

| Symbol | Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU, KC | HG | S | |
| F1-F2 | Fuse 0.5A | AEK-107 | AEK-401 | AEK-107 | |
| F3 | Fuse 1.5A | AEK-104 | ..... | AEK-104 | |
| | Fuse 1.6A | ..... | AEK-405 | ..... | |
| F4-F5 | Fuse 4A | AEK-100 | AEK-400 | AEK-100 | |
| | Fuse 3A | AEK-101 | ..... | ..... | |
| | Fuse 1.6A | ..... | AEK-405 | ..... | |
| | Fuse 1.5A | ..... | ..... | AEK-104 | |

## TRANSFORMER

| Symbol | Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU, KC | HG | S | |
| | Power Transformer | ATT-304 (KU)<br>ATT-320 (KC) | ATT-333<br>..... | ATT-332<br>..... | |

## RESISTOR

| Symbol | Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU, KC | HG | S | |
| R1 | Carbon film 2.2M ½W | RD½PS 225J | ..... | ..... | |

## CAPACITORS

| Symbol | Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU, KC | HG | S | |
| C1 | Ceramic 0.01 250V | ACG-001 (KU) | ACG-001 | ACG-001 | |
| | Ceramic 0.01 125V | ACG-003 (KC) | ..... | ..... | |
| C2 | Ceramic 0.01 125V | ACG-003 | ..... | ..... | |
| | Ceramic 0.01 250V | ..... | ..... | ACG-001 | |
| | Ceramic 9100pF 50V | ..... | CKDYA 912J 50 | ..... | |
| | | ..... | CKDYA 912J 50 | ..... | |

## SWITCHE

| Symbol | Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU, KC | HG | S | |
| | LINE VOLTAGE | ..... | ..... | AKR-031 | 4 position with Fuse holder |
| | SELECTOR | ..... | AKX-037 | ..... | 2 position |
| | Rotary Switch (SPEAKER) | ASA-042 | ASA-045 | ASA-044 | |
| | Slide Switch | ASH-015 | ..... | ASH-017 | |

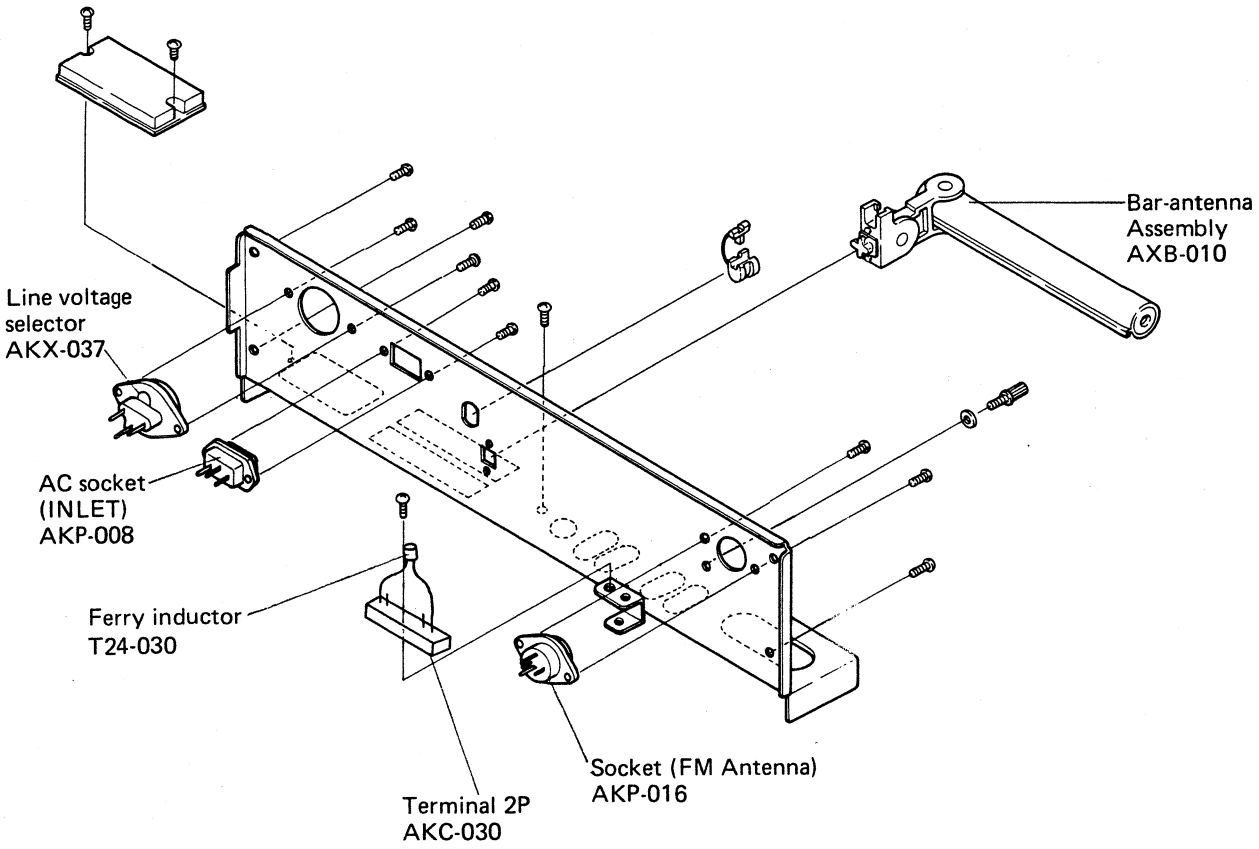
## P.C. BOARD ASSEMBLIES

| Symbol | Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU, KC | HG | S | |
| | RF assembly | AWE-074 | AWE-074 | AWE-074 | |
| | AF assembly | AWK-060 (KU)<br>AWK-064 (KC) | AWK-069 | AWK-067 | |

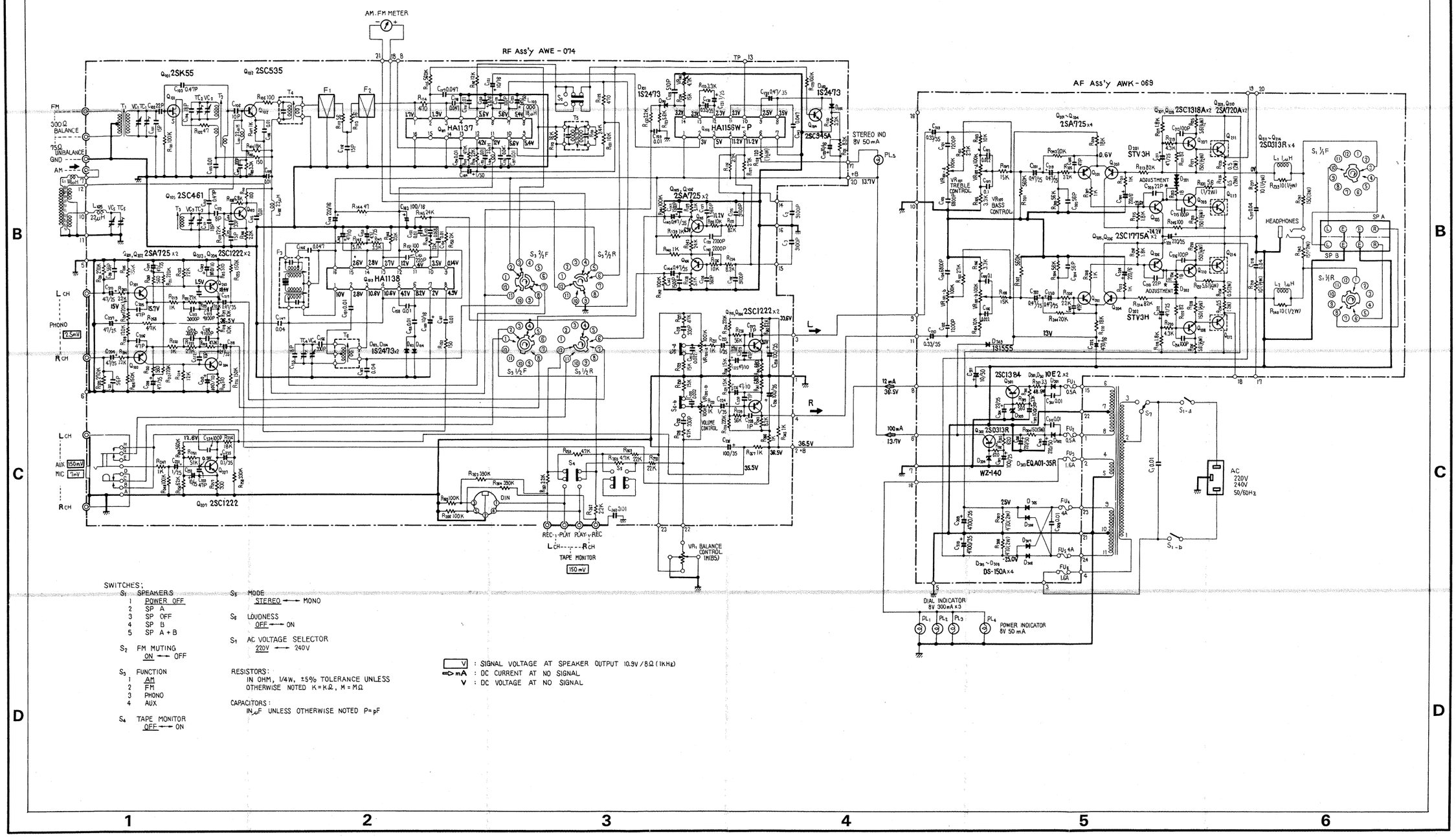
## OTHERS

| Symbol | Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU, KC | HG | S | |
| | AC power cord | ADG-005 | ..... | ADG-002 | |
| | Fuse clip | AKR-030 (KU)<br>AKR-013 (KC) | .....<br>..... | AKR-013<br>..... | |
| | Operating instructions | ARB-185<br>..... | ARB-193<br>ARD-096 | ARB-191<br>..... | English<br>German / French |
| | Top plate | ANE-120 | ANE-131 | ANE-131 | |
| | Packing case | AHD-375 (KU)<br>AHD-376 (KC) | AHD-377<br>..... | AHD-375<br>..... | |
| | Socket (FM antenna) | ..... | AKP-016 | ..... | |
| | Ferrite Bar antenna | AXB-006 | AXB-010 | AXB-006 | |
| L1 | Ferry inductor | ..... | T24-030 | ..... | |
| | Capacitor cover | AEC-279 (KU)<br>AEC-294 (KU)<br>AEC-279 (KC) | AEC-099<br>.....<br>..... | AEC-099<br>.....<br>..... | |
| | AC socket | AKP-004 | AKP-008 | AKP-004 | AKP-008 (INLET) |

# PEAR PANEL HG TYPE



# SCHEMATIC DIAGRAMS, P.C. BOARD PATTERN AND PARTS LIST FOR SX-450/HG




SWITCHES:

$S_1$ SPEAKERS
1 POWER OFF
2 SP A
3 SP OFF
4 SP B
5 SP A + B

$S_2$ FM MUTING
ON ⟷ OFF

$S_3$ FUNCTION
1 AM
2 FM
3 PHONO
4 AUX

$S_4$ TAPE MONITOR
OFF ⟷ ON

$S_5$ MODE
STEREO ⟷ MONO

$S_6$ LOUDNESS
OFF ⟷ ON

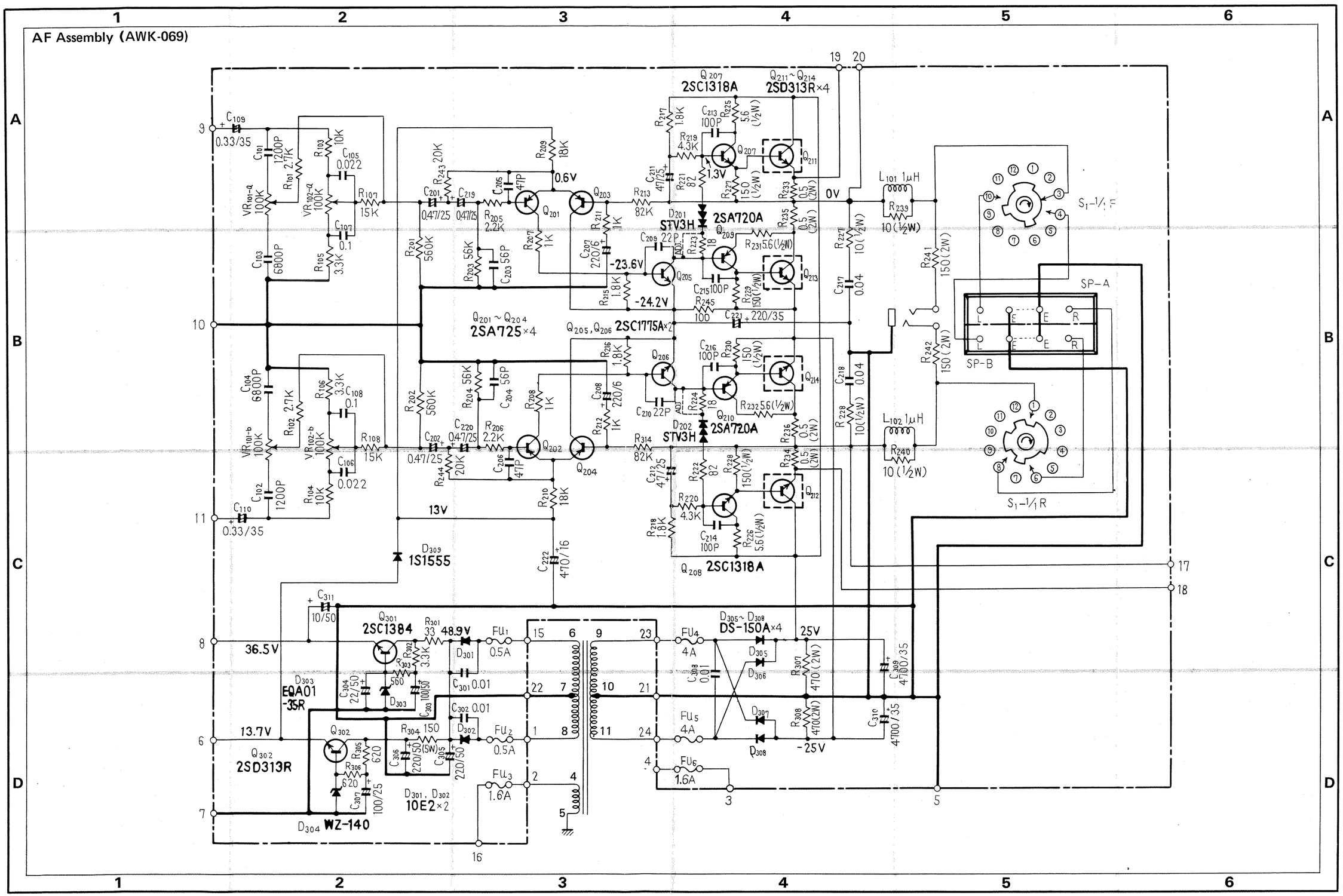
$S_7$ AC VOLTAGE SELECTOR
220V ⟷ 240V

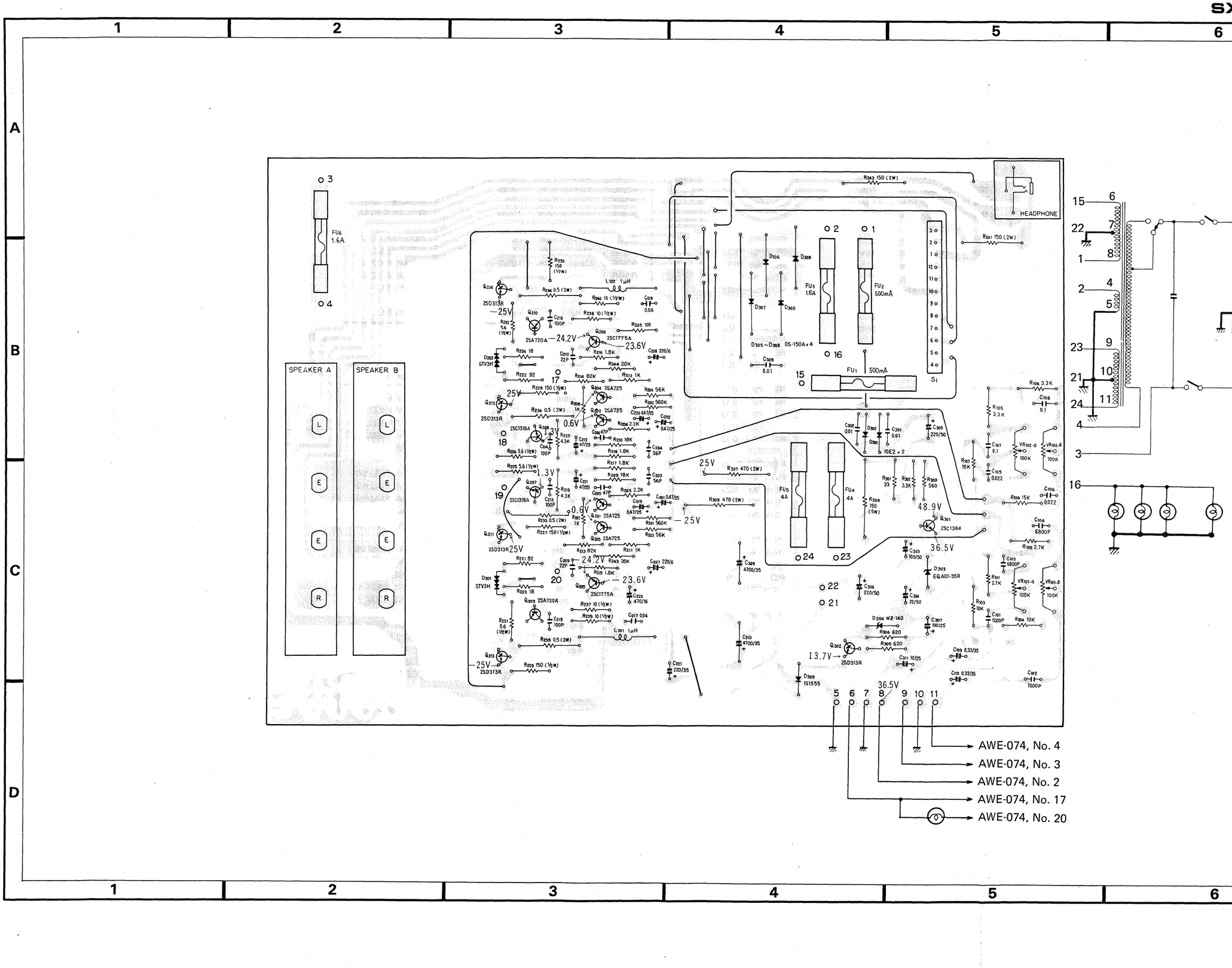
RESISTORS:
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED K=KΩ, M=MΩ

CAPACITORS:
IN μF UNLESS OTHERWISE NOTED P=pF

V : SIGNAL VOLTAGE AT SPEAKER OUTPUT 10.9V / 8Ω (1kHz)
mA : DC CURRENT AT NO SIGNAL
V : DC VOLTAGE AT NO SIGNAL

AF Assembly (AWK-069)




FU6 1.6A
SPEAKER A
SPEAKER B
HEADPHONE
FU1 500mA
FU2 500mA
FU3 1.6A
FU4 4A
FU5 4A
S1
D305~D308 0S-150A x 4
10E2 x 2
EQA01-35R
1S1555
2SC1775A
2SA720A
2SC1318A
2SD313R
2SA725
2SC1384
STV3H
WZ-140
25V
24.2V
23.6V
1.3V
0.6V
48.9V
36.5V
13.7V
AWE-074, No. 4
AWE-074, No. 3
AWE-074, No. 2
AWE-074, No. 17
AWE-074, No. 20

## Parts List of AF Assembly (AWK-069)

### SEMICONDUCTORS

| Symbol | Description | Part No. |
|---|---|---|
| Q201 | Transistor | 2SA725-F (2SA640-F) |
| Q202 | Transistor | 2SA725-F (2SA640-F) |
| Q203 | Transistor | 2SA725-F (2SA640-F) |
| Q204 | Transistor | 2SA725-F (2SA640-F) |
| Q205 | Transistor | 2SC1775A-E |
| Q206 | Transistor | 2SC1775A-E |
| Q207 | Transistor | 2SC1318A-S (2SC1211-D) |
| Q208 | Transistor | 2SC1318A-S (2SC1211-D) |
| Q209 | Transistor | 2SA720A-S (2SA697-D) |
| Q210 | Transistor | 2SA720A-S (2SA697-D) |
| Q211 | Transistor | 2SD313R-D (2SD526-D) |
| Q212 | Transistor | 2SD313R-D (2SD526-D) |
| Q213 | Transistor | 2SD313R-D (2SD526-D) |
| Q214 | Transistor | 2SD313R-D (2SD526-D) |
| Q301 | Transistor | 2SC1384-O |
| Q302 | Transistor | 2SD313R-D (2SD526-D) |
| D201 | Varistor | STV-3H |
| D202 | Varistor | STV-3H |
| D301 | Diode | 10E2 |
| D302 | Diode | 10E2 |
| D303 | Zener diode | EQA01-35R |
| D304 | Zener diode | WZ-140 |
| D305 | Diode | DS-150A (30D2) |
| D306 | Diode | DS-150A (30D2) |
| D307 | Diode | DS-150A (30D2) |
| D308 | Diode | DS-150A (30D2) |
| D309 | Diode | 1S1555 (1S2473) |

### SWITCH AND COILS

| Symbol | Description | Part No. |
|---|---|---|
| | Rotary Switch (SPEAKERS) | ASA-045 |
| L101 | AF choke coil 1μH | ATH-011 |
| L102 | AF choke coil 1μH | ATH-011 |

### RESISTORS

| Symbol | Description | | | Part No. |
|---|---|---|---|---|
| VR101 | Variable 100kΩ-A dual (TREBLE) | | | ACV-180 |
| VR102 | Variable 100kΩ-A dual (BASS) | | | ACV-180 |
| R101 | Carbon film | 2.7k | | RD¼PSF 272J |
| R102 | Carbon film | 2.7k | | RD¼PSF 272J |
| R103 | Carbon film | 10k | | RD¼PSF 103J |
| R104 | Carbon film | 10k | | RD¼PSF 103J |
| R105 | Carbon film | 3.3k | | RD¼PSF 332J |
| R106 | Carbon film | 3.3k | | RD¼PSF 332J |
| R107 | Carbon film | 15k | | RD¼PSF 153J |
| R108 | Carbon film | 15k | | RD¼PSF 153J |
| R201 | Carbon film | 560k | | RD¼PSF 564J |
| R202 | Carbon film | 560k | | RD¼PSF 564J |
| R203 | Carbon film | 56k | | RD¼PSF 563J |
| R204 | Carbon film | 56k | | RD¼PSF 563J |
| R205 | Carbon film | 2.2k | | RD¼PSF 222J |
| R206 | Carbon film | 2.2k | | RD¼PSF 222J |
| R207 | Carbon film | 1k | | RD¼PSF 102J |
| R208 | Carbon film | 1k | | RD¼PSF 102J |
| R209 | Carbon film | 18k | | RD¼PSF 183J |
| R210 | Carbon film | 18k | | RD¼PSF 183J |
| R211 | Carbon film | 1k | | RD¼PSF 102J |
| R212 | Carbon film | 1k | | RD¼PSF 102J |
| R213 | Carbon film | 82k | | RD¼PSF 823J |
| R214 | Carbon film | 82k | | RD¼PSF 823J |
| R215 | Carbon film | 1.8k | | RD¼PSF 182J |
| R216 | Carbon film | 1.8k | | RD¼PSF 182J |
| R217 | Carbon film | 1.8k | | RD¼PSF 182J |
| R218 | Carbon film | 1.8k | | RD¼PSF 182J |
| R219 | Carbon film | 4.3k | | RD¼PSF 432J |
| R220 | Carbon film | 4.3k | | RD¼PSF 432J |
| R221 | Carbon film | 82 | | RD¼PSF 820J |
| R222 | Carbon film | 82 | | RD¼PSF 820J |
| R223 | Carbon film | 18 | | RD¼PSF 180J |
| R224 | Carbon film | 18 | | RD¼PSF 180J |
| R225 | Carbon film | 5.6 | ½W | RD½PSF 5R6J |
| R226 | Carbon film | 5.6 | ½W | RD½PSF 5R6J |
| R227 | Carbon film | 150 | ½W | RD½PSF 151J |
| R228 | Carbon film | 150 | ½W | RD½PSF 151J |
| R229 | Carbon film | 150 | ½W | RD½PSF 151J |
| R230 | Carbon film | 150 | ½W | RD½PSF 151J |
| R231 | Carbon film | 5.6 | ½W | RD½PSF 5R6J |
| R232 | Carbon film | 5.6 | ½W | RD½PSF 5R6J |
| R233 | Metal film | 0.5 | 2W | RN2H 0R5K |
| R234 | Metal film | 0.5 | 2W | RN2H 0R5K |
| R235 | Metal film | 0.5 | 2W | RN2H 0R5K |
| R236 | Metal film | 0.5 | 2W | RN2H 0R5K |
| R237 | Carbon film | 10 | ½W | RD½PSF 100J |
| R238 | Carbon film | 10 | ½W | RD½PSF 100J |
| R239 | Carbon film | 10 | ½W | RD½PSF 100J |
| R240 | Carbon film | 10 | ½W | RD½PSF 100J |
| R241 | Metal oxide film | 150 | 2W | RS2P 151J |
| R242 | Metal oxide film | 150 | 2W | RS2P 151J |
| R243 | Carbon film | 20k | | RD¼PSF 203J |
| R244 | Carbon film | 20k | | RD¼PSF 203J |
| R245 | Carbon film | 100 | | RD¼PSF 101J |
| R301 | Carbon film | 33 | | RD¼PSF 330J |
| R302 | Carbon film | 3.3k | | RD¼PSF 332J |
| R303 | Carbon film | 560 | | RD¼PSF 561J |
| R304 | Wire wound | 150 | 5W | RT5B 151K |
| R305 | Carbon film | 620 | | RD¼PSF 621J |
| R306 | Carbon film | 620 | | RD¼PSF 621J |
| R307 | Metal oxide film | 470 | 2W | RS2P 471J |
| R308 | Metal oxide film | 470 | 2W | RS2P 471J |

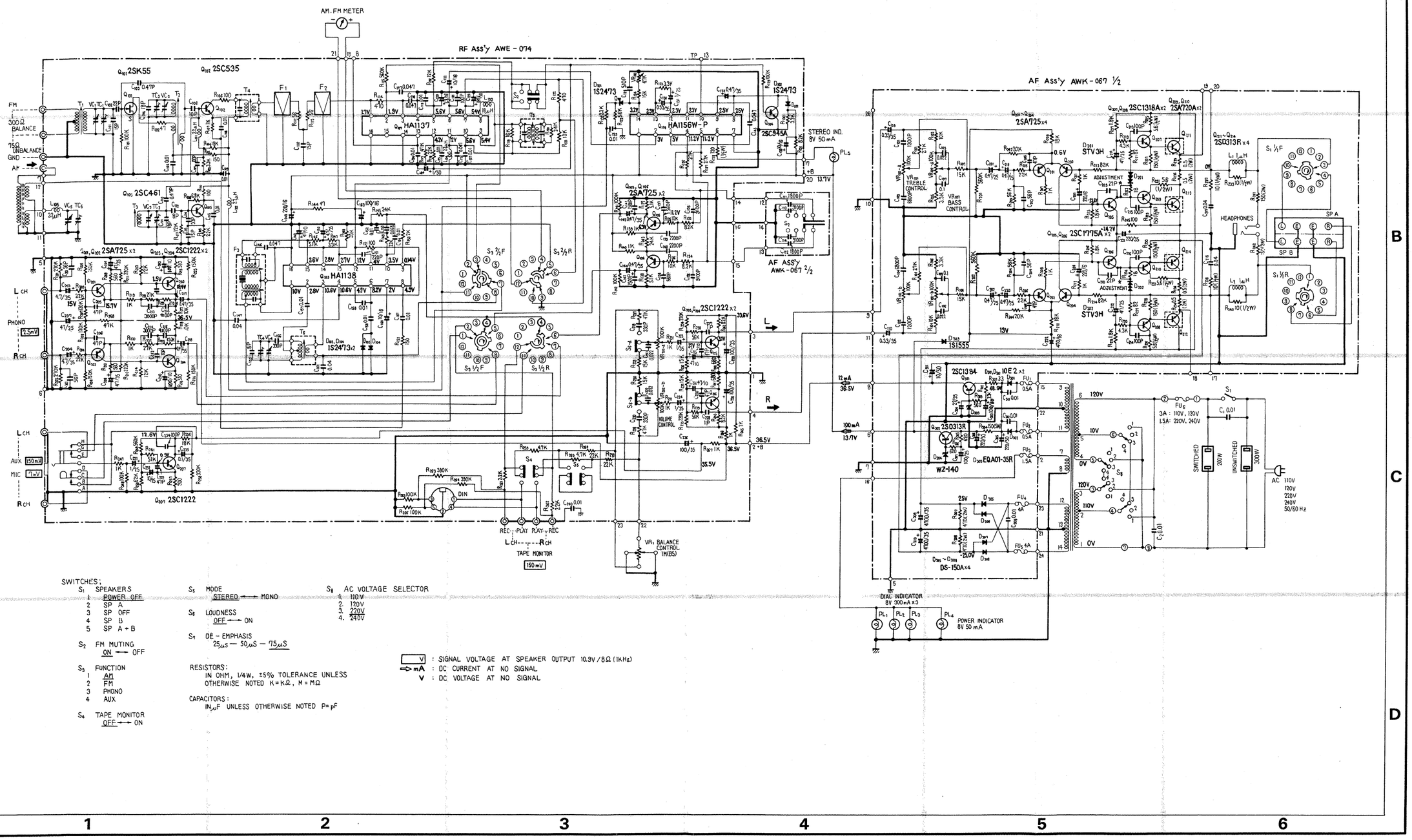
### CAPACITORS

| Symbol | Description | | | Part No. |
|---|---|---|---|---|
| C101 | Ceramic | 1200p | 50V | CKDYA 122J 50 |
| C102 | Ceramic | 1200p | 50V | CKDYA 122J 50 |
| C103 | Ceramic | 6800p | 50V | CKDYA 682J 50 |
| C104 | Ceramic | 6800p | 50V | CKDYA 682J 50 |
| C105 | Mylar | 0.022 | 50V | CQMA 223J 50 |
| C106 | Mylar | 0.022 | 50V | CQMA 223J 50 |
| C107 | Mylar | 0.1 | 50V | CQMA 104J 50 |
| C108 | Mylar | 0.1 | 50V | CQMA 104J 50 |
| C109 | Electrolytic | 0.33 | 35V | CSZA R33M 35 |
| C110 | Electrolytic | 0.33 | 35V | CSZA R33M 35 |
| C201 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C202 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C203 | Ceramic | 56p | 50V | CCDSL 560K 50 |
| C204 | Ceramic | 56p | 50V | CCDSL 560K 50 |
| C205 | Ceramic | 47p | 50V | CCDSL 470K 50 |
| C206 | Ceramic | 47p | 50V | CCDSL 470K 50 |
| C207 | Electrolytic | 220 | 6V | CEA 221P 6 |
| C208 | Electrolytic | 220 | 6V | CEA 221P 6 |
| C209 | Ceramic | 22p | 50V | CCDSL 220K 50 |
| C210 | Ceramic | 22p | 50V | CCDSL 220K 50 |
| C211 | Electrolytic | 47 | 25V | CEA 470P 25 |
| C212 | Electrolytic | 47 | 25V | CEA 470P 25 |
| C213 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C214 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C215 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C216 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C217 | Ceramic | 0.04 | 50V | CKDYF 403Z 50 |
| C218 | Ceramic | 0.04 | 50V | CKDYF 403Z 50 |
| C219 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C220 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C221 | Electrolytic | 220 | 35V | CEA 221P 50 |
| C222 | Electrolytic | 470 | 16V | CEA 471P 16 |
| C301 | Ceramic | 0.01 | 150V | ACG-004 |
| C302 | Ceramic | 0.01 | 150V | ACG-004 |
| C303 | Electrolytic | 100 | 50V | CEA 101P 50 |
| C304 | Electrolytic | 22 | 50V | CEA 220P 50 |
| C305 | Electrolytic | 220 | 50V | CEA 221P 50 |
| C306 | Electrolytic | 220 | 50V | CEA 221P 50 |
| C307 | Electrolytic | 100 | 25V | CEA 101P 25 |
| C308 | Ceramic | 0.01 | 150V | ACG-004 |
| C309 | Electrolytic | 4700 | 35V | ACH-043 |
| C310 | Electrolytic | 4700 | 35V | ACH-043 |
| C311 | Electrolytic | 10 | 50V | CEA 100P 50 |

### OTHERS

| Symbol | Description | Part No. |
|---|---|---|
| | Heat sink (small) | ANH-117 |
| | Terminal (SPEAKERS) | AKE-029 |
| | Phone jack | AKN-009 |
| | Fuse clip | AKR-010 |

# SCHEMATIC DIAGRAM, P.C. BOARD PATTERN AND PARTS LIST FOR SX-450/S




SWITCHES:

$S_1$ SPEAKERS
1. POWER OFF
2. SP A
3. SP OFF
4. SP B
5. SP A + B

$S_2$ FM MUTING
ON ⟷ OFF

$S_3$ FUNCTION
1. AM
2. FM
3. PHONO
4. AUX

$S_4$ TAPE MONITOR
OFF ⟷ ON

$S_5$ MODE
STEREO ⟷ MONO

$S_6$ LOUDNESS
OFF ⟷ ON

$S_7$ DE-EMPHASIS
$25\mu S$ — $50\mu S$ — $75\mu S$

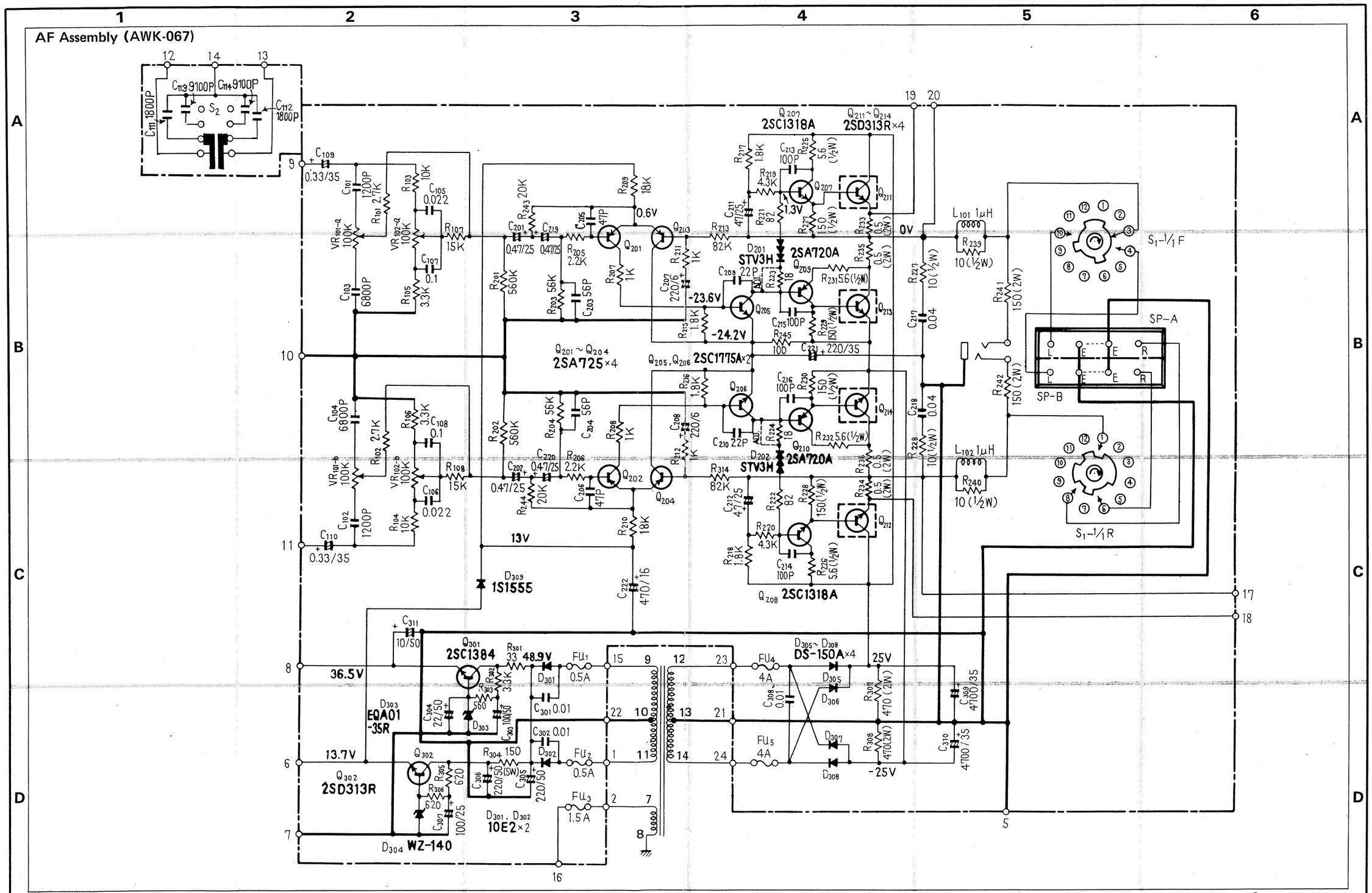
$S_8$ AC VOLTAGE SELECTOR
1. 110V
2. 120V
3. 220V
4. 240V

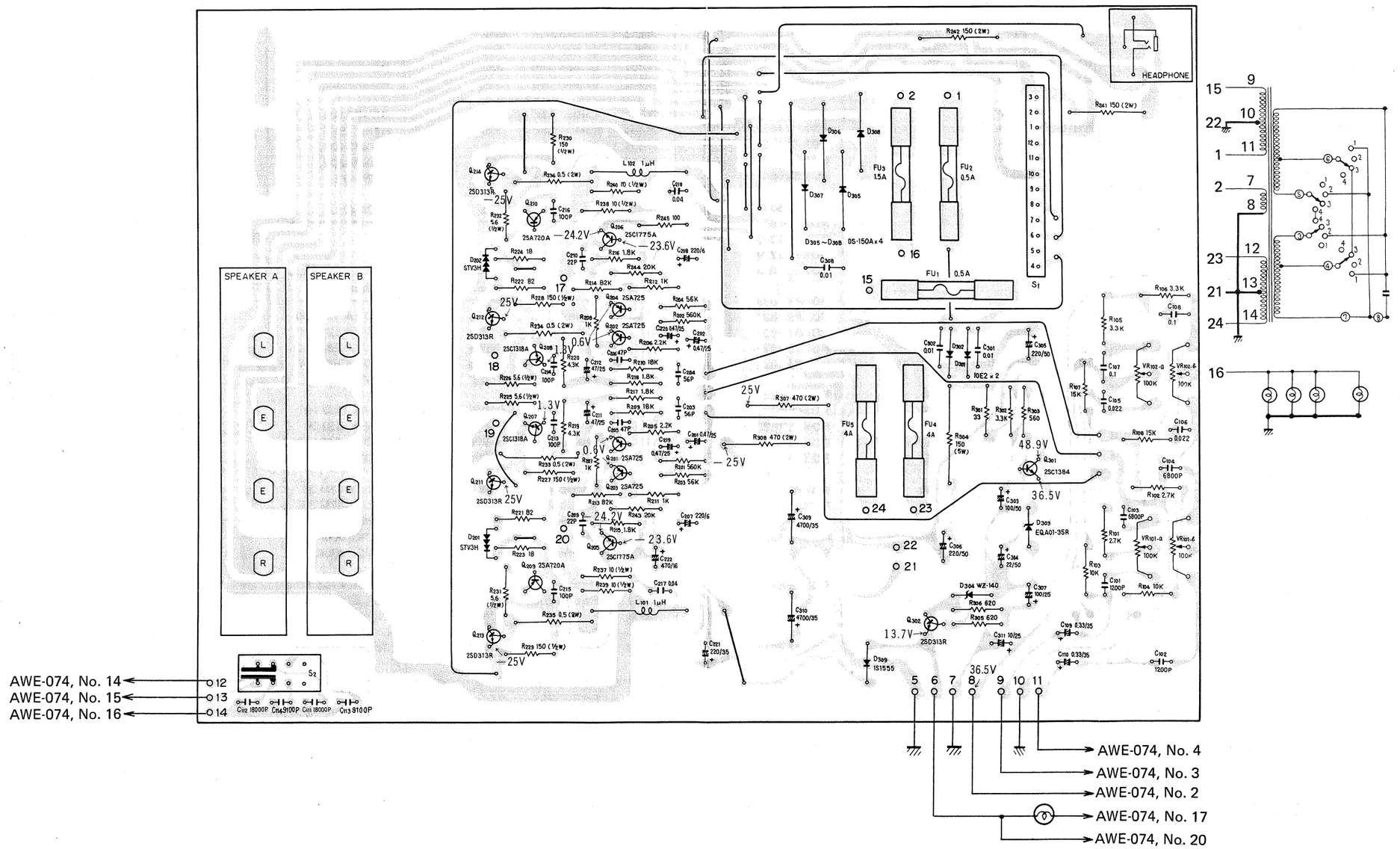
RESISTORS:
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED K=KΩ, M=MΩ

CAPACITORS:
IN μF UNLESS OTHERWISE NOTED P=pF

[V] : SIGNAL VOLTAGE AT SPEAKER OUTPUT 10.9V/8Ω (1KHz)
⇨mA : DC CURRENT AT NO SIGNAL
V : DC VOLTAGE AT NO SIGNAL

AF Assembly (AWK-067)




SPEAKER A
SPEAKER B
HEADPHONE
AWE-074, No. 14
AWE-074, No. 15
AWE-074, No. 16
AWE-074, No. 4
AWE-074, No. 3
AWE-074, No. 2
AWE-074, No. 17
AWE-074, No. 20
25V
24.2V
23.6V
1.3V
0.6V
48.9V
36.5V
13.7V

## AF Ass'y AWK-067

### SEMICONDUCTORS

| Symbol | Description | Part No. |
|---|---|---|
| Q201 | Transistor | 2SA725-F (2SA640-F) |
| Q202 | Transistor | 2SA725-F (2SA640-F) |
| Q203 | Transistor | 2SA725-F (2SA640-F) |
| Q204 | Transistor | 2SA725-F (2SA640-F) |
| Q205 | Transistor | 2SC1775A-E |
| Q206 | Transistor | 2SC1775A-E |
| Q207 | Transistor | 2SC1318A-S (2SC1211-D) |
| Q208 | Transistor | 2SC1318A-S (2SC1211-D) |
| Q209 | Transistor | 2SA720A-S (2SA697-D) |
| Q210 | Transistor | 2SA720A-S (2SA697-D) |
| Q211 | Transistor | 2SD313R-D (2SD526-D) |
| Q212 | Transistor | 2SD313R-D (2SD526-D) |
| Q213 | Transistor | 2SD313R-D (2SD526-D) |
| Q214 | Transistor | 2SD313R-D (2SD526-D) |
| Q301 | Transistor | 2SC1384-Q |
| Q302 | Transistor | 2SD313R-D (2SD526-D) |
| D201 | Varistor | STV-3H |
| D202 | Varistor | STV-3H |
| D301 | Diode | 10E2 |
| D302 | Diode | 10E2 |
| D303 | Zener diode | EQA01-35R |
| D304 | Zener diode | WZ-140 |
| D305 | Diode | DS-150A (30D2) |
| D306 | Diode | DS-150A (30D2) |
| D307 | Diode | DS-150A (30D2) |
| D308 | Diode | DS-150A (30D2) |
| D309 | Diode | 1S1555 (1S2473) |

### SWITCHES AND COILS

| Symbol | Description | Part No. |
|---|---|---|
| | Rotary switch (SPEAKERS) | ASA-044 |
| | Slide Switch (DE-EMPHASIS) | ASH-017 |
| L101 | AF choke coil 1μH | ATH-011 |
| L102 | AF choke coil 1μH | ATH-011 |

### RESISTORS

| Symbol | Description | | Part No. |
|---|---|---|---|
| VR101 | Variable 100kΩ-A dual (TREBLE) | | ACV-180 |
| VR102 | Variable 100kΩ-A dual (BASS) | | ACV-180 |
| R101 | Carbon film | 2.7k | RD¼PS 272J |
| R102 | Carbon film | 2.7k | RD¼PS 272J |
| R103 | Carbon film | 10k | RD¼PS 103J |
| R104 | Carbon film | 10k | RD¼PS 103J |
| R105 | Carbon film | 3.3k | RD¼PS 332J |
| R106 | Carbon film | 3.3k | RD¼PS 332J |
| R107 | Carbon film | 15k | RD¼PS 153J |
| R108 | Carbon film | 15k | RD¼PS 153J |
| R201 | Carbon film | 560k | RD¼PS 564J |
| R202 | Carbon film | 560k | RD¼PS 564J |
| R203 | Carbon film | 56k | RD¼PS 563J |
| R204 | Carbon film | 56k | RD¼PS 563J |
| R205 | Carbon film | 2.2k | RD¼PS 222J |
| R206 | Carbon film | 2.2k | RD¼PS 222J |
| R207 | Carbon film | 1k | RD¼PS 102J |
| R208 | Carbon film | 1k | RD¼PS 102J |
| R209 | Carbon film | 18k | RD¼PS 183J |
| R210 | Carbon film | 18k | RD¼PS 183J |
| R211 | Carbon film | 1k | RD¼PS 102J |
| R212 | Carbon film | 1k | RD¼PS 102J |
| R213 | Carbon film | 82k | RD¼PS 823J |
| R214 | Carbon film | 82k | RD¼PS 823J |
| R215 | Carbon film | 1.8k | RD¼PS 182J |
| R216 | Carbon film | 1.8k | RD¼PS 182J |
| R217 | Carbon film | 1.8k | RD¼PS 182J |
| R218 | Carbon film | 1.8k | RD¼PS 182J |
| R219 | Carbon film | 4.3k | RD¼PS 432J |
| R220 | Carbon film | 4.3k | RD¼PS 432J |
| R221 | Carbon film | 82 | RD¼PS 820J |
| R222 | Carbon film | 82 | RD¼PS 820J |
| R223 | Carbon film | 18 | RD¼PS 180J |
| R224 | Carbon film | 18 | RD¼PS 180J |
| R225 | Carbon film | 5.6 ½W | RD½PS 5R6J |
| R226 | Carbon film | 5.6 ½W | RD½PS 5R6J |
| R227 | Carbon film | 150 ½W | RD½PS 151J |
| R228 | Carbon film | 150 ½W | RD½PS 151J |
| R229 | Carbon film | 150 ½W | RD½PS 151J |
| R230 | Carbon film | 150 ½W | RD½PS 151J |
| R231 | Carbon film | 5.6 ½W | RD½PS 5R6J |
| R232 | Carbon film | 5.6 ½W | RD½PS 5R6J |
| R233 | Metal film | 0.5 2W | RN2H 0R5K |
| R234 | Metal film | 0.5 2W | RN2H 0R5K |
| R235 | Metal film | 0.5 2W | RN2H 0R5K |
| R236 | Metal film | 0.5 2W | RN2H 0R5K |
| R237 | Carbon film | 10 ½W | RD½PS 100J |
| R238 | Carbon film | 10 ½W | RD½PS 100J |
| R239 | Carbon film | 10 ½W | RD½PS 100J |
| R240 | Carbon film | 10 ½W | RD½PS 100J |
| R241 | Metal oxide film | 150 2W | RS2P 151J |
| R242 | Metal oxide film | 150 2W | RS2P 151J |
| R243 | Carbon film | 20k | RD¼PS 203J |
| R244 | Carbon film | 20k | RD¼PS 203J |
| R245 | Carbon film | 100 | RD¼PS 101J |
| R301 | Carbon film | 33 | RD¼PSF 330J |
| R302 | Carbon film | 3.3k | RD¼PS 332J |
| R303 | Carbon film | 560 | RD¼PS 561J |
| R304 | Ware wound | 150 5W | RT5B 151K |
| R305 | Carbon film | 620 | RD¼PS 621J |
| R306 | Carbon film | 620 | RD¼PS 621J |
| R307 | Metal oxide film | 470 2W | RS2P 471J |
| R308 | Metal oxide film | 470 2W | RS2P 471J |

### CAPACITORS

| Symbol | Description | | | Part No. |
|---|---|---|---|---|
| C101 | Ceramic | 1200p | 50V | CKDYA 122J 50 |
| C102 | Ceramic | 1200p | 50V | CKDYA 122J 50 |
| C103 | Ceramic | 6800p | 50V | CKDYA 682J 50 |
| C104 | Ceramic | 6800p | 50V | CKDYA 682J 50 |
| C105 | Mylar | 0.022 | 50V | CQMA 223J 50 |
| C111 | Mylar | 0.018 | 50V | CQMA 183J 50 |
| C112 | Mylar | 0.018 | 50V | CQMA 183J 50 |
| C113 | Ceramic | 9100p | 50V | CKDYA 912J 50 |
| C114 | Ceramic | 9100p | 50V | CKDYA 912J 50 |
| C201 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C202 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C203 | Ceramic | 56p | 50V | CCDSL 560K 50 |
| C204 | Ceramic | 56p | 50V | CCDKS 560K 50 |
| C205 | Ceramic | 47p | 50V | CCDSL 470K 50 |
| C206 | Ceramic | 47p | 50V | CCDSL 470K 50 |
| C207 | Electrolytic | 220 | 6V | CEA 221P 6 |
| C208 | Electrolytic | 220 | 6V | CEA 221P 6 |
| C209 | Ceramic | 22p | 50V | CCDSL 220K 50 |
| C210 | Ceramic | 22p | 50V | CCDSL 220K 50 |
| C211 | Electrolytic | 47 | 25V | CEA 470P 25 |
| C212 | Electrolytic | 47 | 25V | CEA 470P 25 |
| C213 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C214 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C215 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C216 | Ceramic | 100p | 50V | CCDSL 101P 50 |
| C217 | Ceramic | 0.04 | 50V | CKDYF 403Z 50 |
| C218 | Ceramic | 0.04 | 50V | CKDYF 403Z 50 |
| C219 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C220 | Electrolytic | 0.47 | 35V | CSZA R47M 35 |
| C221 | Electrolytic | 220 | 35V | CEA 221P 50 |
| C222 | Electrolytic | 470 | 16V | CEA 471P 16 |
| C301 | Ceramic | 0.01 | 150V | ACG-004 |
| C302 | Ceramic | 0.01 | 150V | ACG-004 |
| C303 | Electrolytic | 100 | 50V | CEA 101P 50 |
| C304 | Electrolytic | 22 | 50V | CEA 220P 50 |
| C305 | Electrolytic | 220 | 50V | CEA 221P 50 |
| C306 | Electrolytic | 220 | 50V | CEA 221P 50 |
| C307 | Electrolytic | 100 | 25V | CEA 101P 25 |
| C308 | Ceramic | 0.01 | 150V | ACG-004 |
| C309 | Electrolytic | 4700 | 35V | ACH-043 |
| C310 | Electrolytic | 4700 | 35V | ACH-043 |
| C311 | Electrolytic | 10 | 50V | CEA 100P 50 |

### OTHERS

| Symbol | Description | Part No. |
|---|---|---|
| | Heat sink (small) | ANH-117 |
| | Terminal (SPEAKERS) | AKE-029 |
| | Phone jack | AKN-009 |
| | Fuse clip | AKR-013 |

# AM/FM STEREO RECEIVER

# SX-450 HG

FM - Signal Messung s. Plan II

RF Ass'y AWE-074

SWITCHES;

$S_1$ SPEAKERS
- 1 POWER OFF
- 2 SP A
- 3 SP OFF
- 4 SP B
- 5 SP A + B

$S_2$ FM MUTING
ON ⟷ OFF

$S_3$ FUNCTION
- 1 AM
- 2 FM
- 3 PHONO
- 4 AUX

$S_4$ TAPE MONITOR
OFF ⟷ ON

$S_5$ MODE
STEREO ⟷ MONO

$S_6$ LOUDNESS
OFF ⟷ ON

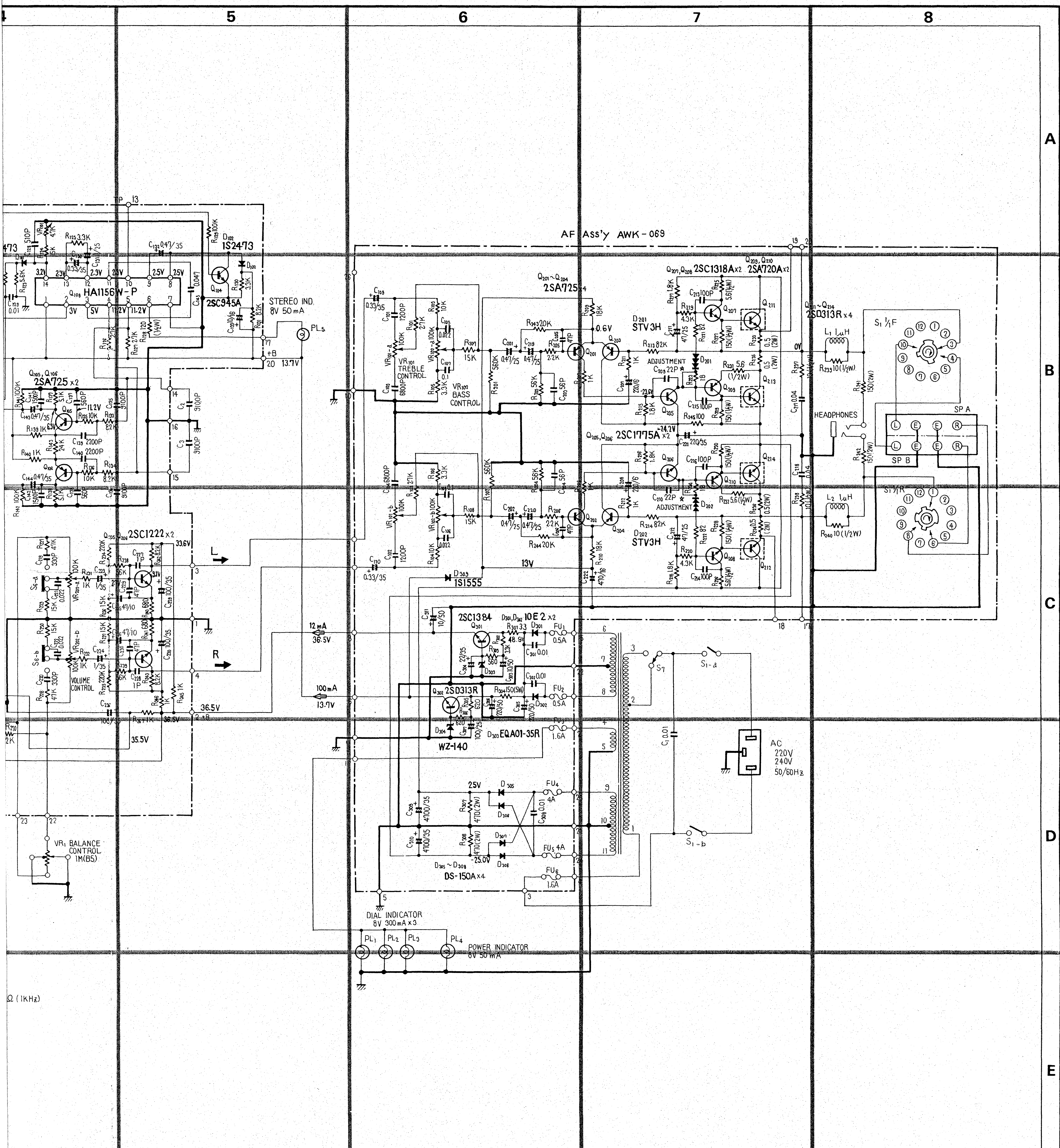
$S_7$ AC VOLTAGE SELECTOR
220V ⟷ 240V

RESISTORS:
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED K=KΩ, M=MΩ

CAPACITORS:
IN μF UNLESS OTHERWISE NOTED P=pF

[V] : SIGNAL VOLTAGE AT SPEAKER OUTPUT 10.9V/8Ω (1KHz)
⇨mA : DC CURRENT AT NO SIGNAL
V : DC VOLTAGE AT NO SIGNAL

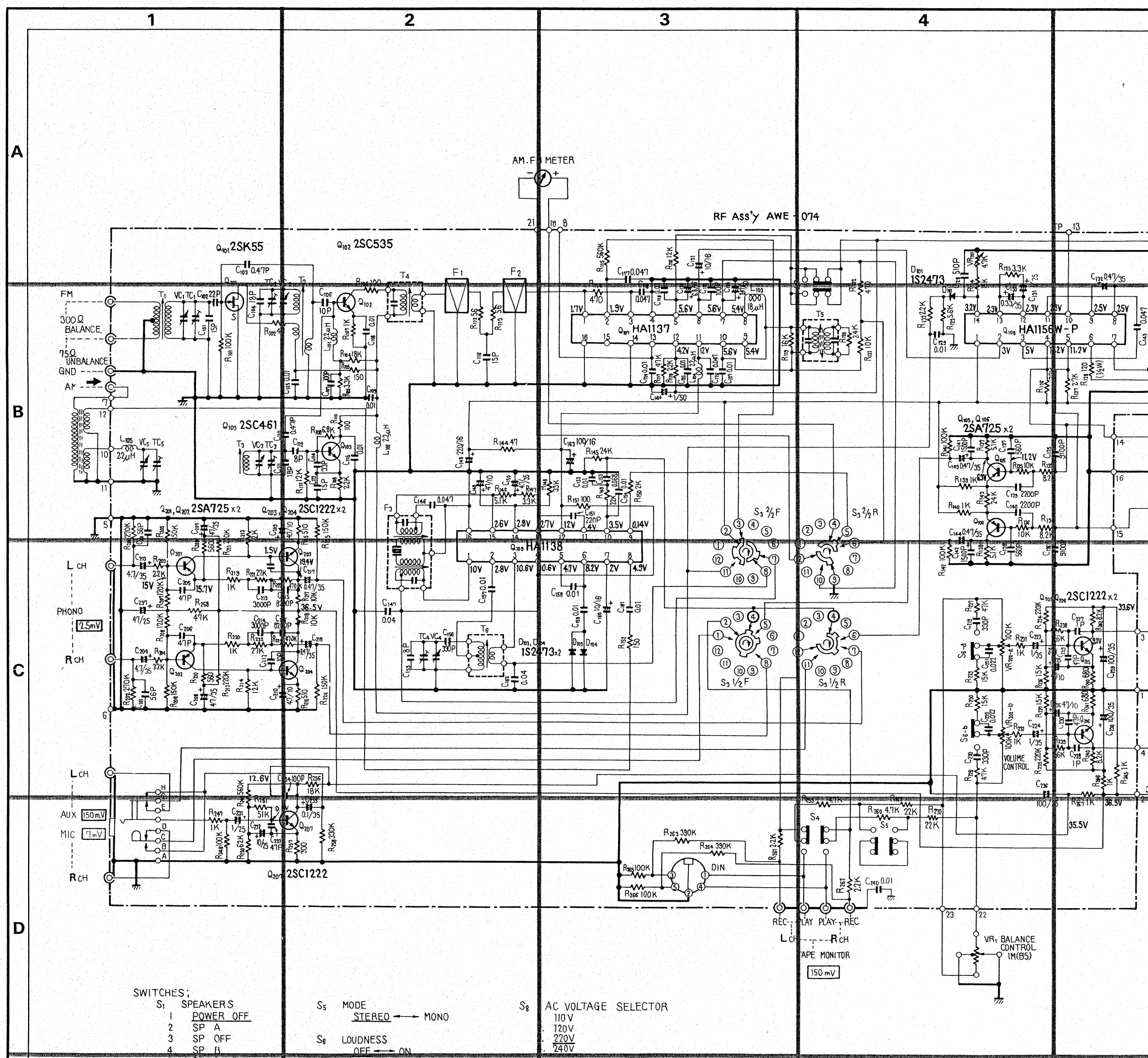
PIONEER



AF Ass'y AWK-069
HA1156W-P
2SC945A
STEREO IND. 8V 50mA
PL5
1S2473
Q105, Q106 2SA725 x2
Q205, Q206 2SC1222 x2
VOLUME CONTROL
VR1 BALANCE CONTROL 1M(B5)
VR101 TREBLE CONTROL
VR102 BASS CONTROL
Q201~Q204 2SA725 x4
Q207, Q208 2SC1318A x2
Q209, Q210 2SA720A x2
Q211~Q214 2SD313R x4
Q205, Q206 2SC1775A x2
D201 STV3H
D202 STV3H
ADJUSTMENT
HEADPHONES
SP A
SP B
L1 1μH
L2 1μH
D309 1S1555
2SC1384
D301, D302 10E2 x2
Q302 2SD313R
WZ-140
D303 EQA01-35R
D305~D308 DS-150A x4
DIAL INDICATOR 8V 300mA x3
POWER INDICATOR 8V 50mA
AC 220V 240V 50/60Hz
12mA 36.5V
100mA 13.7V
36.5V
33.6V
13.7V
13V
25V
-25.0V
Ω (1KHz)

# AM/FM STEREO RECEIVER

# SX-450 S




SWITCHES;

$S_1$ SPEAKERS
1 POWER OFF
2 SP A
3 SP OFF
4 SP B
5 SP A + B

$S_2$ FM MUTING
ON ⟷ OFF

$S_3$ FUNCTION
1 AM
2 FM
3 PHONO
4 AUX

$S_4$ TAPE MONITOR
OFF ⟷ ON

$S_5$ MODE
STEREO ⟷ MONO

$S_6$ LOUDNESS
OFF ⟷ ON

$S_7$ DE - EMPHASIS
25μs — 50μS — 75μS

$S_8$ AC VOLTAGE SELECTOR
110 V
120V
220V
240V

RESISTORS:
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED K=KΩ, M=MΩ

CAPACITORS:
IN μF UNLESS OTHERWISE NOTED P=pF

[V] : SIGNAL VOLTAGE AT SPEAKER OUTPUT 10.9V / 8Ω (1kHz)
⇨mA : DC CURRENT AT NO SIGNAL
V : DC VOLTAGE AT NO SIGNAL

PIONEER®

AF Ass'y AWK-067 1/2

HA1156W-P

2SC945A

1S2473

2SA725 x2

2SA725 x4

2SC1318A x2

2SA720A x2

STV3H

2SC1775A x2

2SD313R x4

2SC1222 x2

2SC1384

1S1555

WZ-140

DS-150A x4

EQA01-35R

10E2 x2

AF Ass'y AWK-067 2/2

STEREO IND. 8V 50mA

TREBLE CONTROL

BASS CONTROL

VOLUME CONTROL

VR1 BALANCE CONTROL 1M(B5)

ADJUSTMENT

HEADPHONES

SP A

SP B

DIAL INDICATOR 8V 300mA x3

POWER INDICATOR 8V 50mA

FU6 3A : 110V, 120V 1.5A: 220V, 240V

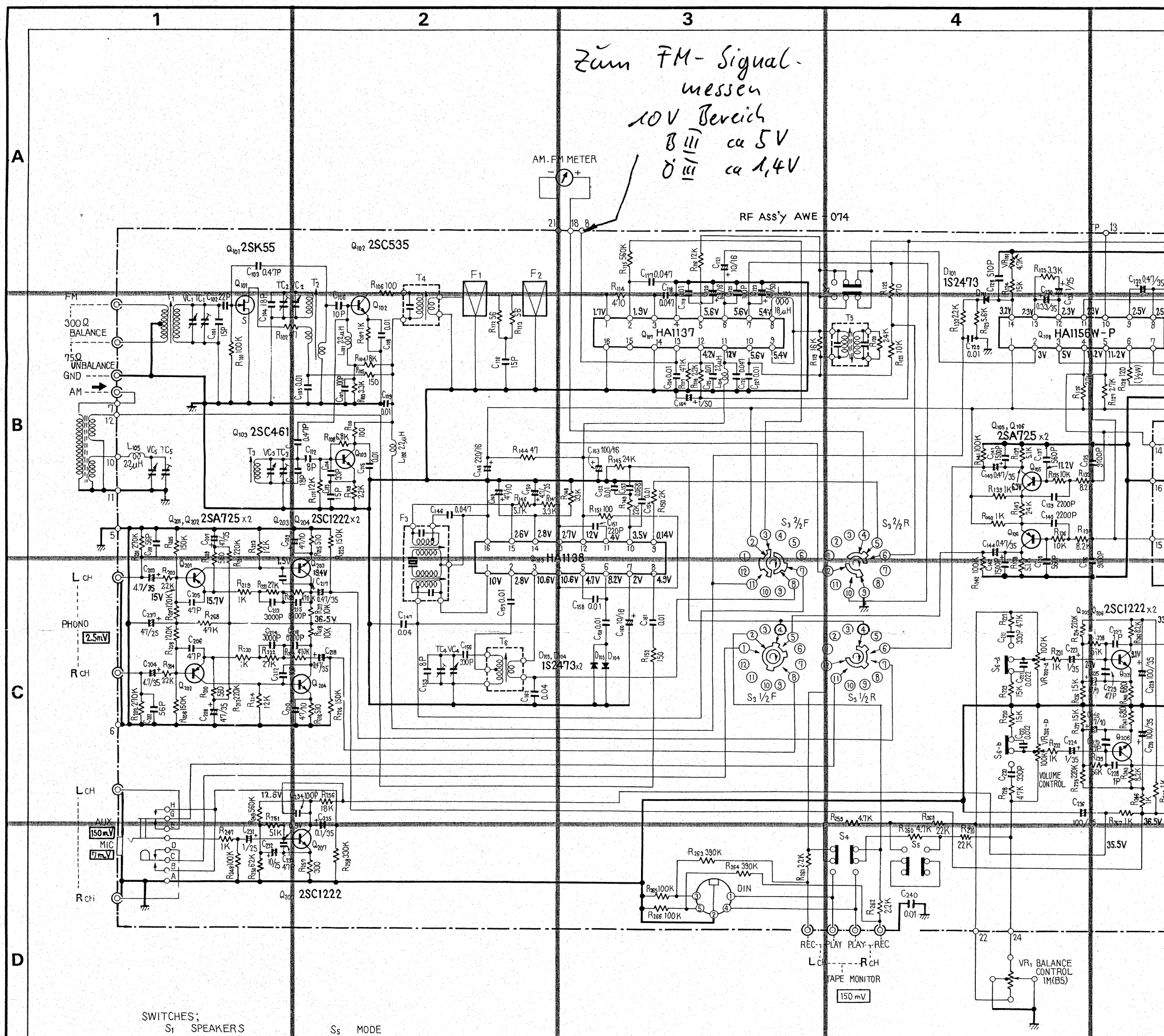
SWITCHED 250W

UNSWITCHED 300W

AC 110V 120V 220V 240V 50/60Hz

# AM/FM STEREO RECEIVER

# SX-450 KU KC




SWITCHES;

$S_1$ SPEAKERS
1 POWER OFF
2 SP A
3 SP OFF
4 SP B
5 SP A+B

$S_2$ FM MUTING
ON ⟷ OFF

$S_3$ FUNCTION
1 AM
2 FM
3 PHONO
4 AUX

$S_4$ TAPE MONITOR
OFF ⟷ ON

$S_5$ MODE
STEREO ⟷ MONO

$S_6$ LOUDNESS
OFF ⟷ ON

$S_7$ DE-EMPHASIS
25μs ⟷ 75μs

RESISTORS:
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED K=KΩ, M=MΩ

CAPACITORS:
IN μF UNLESS OTHERWISE NOTED P=pF

V : SIGNAL VOLTAGE AT SPEAKER OUTPUT 10.9V / 8Ω (1KHz)
mA : DC CURRENT AT NO SIGNAL
V : DC VOLTAGE AT NO SIGNAL

PIONEER®

AF Ass'y AWK-064 1/2 (CSA-approved model)
AWK-060 1/2 (UL-approved model)

HA1156W-P

2SC945A

1S2473

2SA725 x4

2SC1318A x2

2SA720A x2

STV3H

2SD313R x4

2SC1775A x2

2SC1222 x2

2SC1384

10E2 x2

WZ-140

EQA01-35R

DS-150A x4

AWK-064

SWITCHED 200W

UNSWITCHED 300W

AC 120V 60Hz

CSA APPROVED MODEL

AF ASS'Y AWK-060 2/2 AWK-064 2/2

VR1 BALANCE CONTROL 1M(B5)

VR101 TREBLE CONTROL

VR102 BASS CONTROL

VOLUME CONTROL

ADJUSTMENT

STEREO IND. 8V 50mA

DIAL INDICATOR 8V 300mA x3

POWER INDICATOR 8V 50mA

HEADPHONES

SP A

SP B

(1KHz)